Gas Journal

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Editorial Notes

Analyze the Trends

In a Paper at a recent meeting of the Glasgow Section of the Society of Chemical Industry Dr. F. S. Sinnatt, Director of Fuel Research, questioned the soundness of the lines on which the policy of the Gas Industry is being framed; and the broad issues he raised demand the fullest consideration. If we interpret him rightly, his contention is that our Industry does not appreciate as it should the fact that it is supplying the requirements of a fluid, ever-changing market, that it will flounder badly if it regards this market as being static, that it needs a great deal more quantitative information of what is taking place in the domestic heating field, a surer knowledge of how the changing habits of the people and the sway of public opinion will influence the future sales of gas and coke. In the first place he calls attention to the magnitude of the domestic heating market, all of which is supplied at the outset by the coal mines. Our Industry converts about 17 million tons of coal a year into gas and coke and other valuable products. In doing so it is satisfying a growing public demand for the abatement of the smoke nuisance. The electricity industry converts a matter of 12 million tons of coal into electrical energy, and it should be borne in mind that three large generating stations recently erected offer to the community light, power, and heat, produced by burning coal, without polluting the atmosphere with smoke, grit, or acid gases. This unquestionably will have a favourable effect on public opinion. The coke oven industry, besides supplying about 11% of the total gas sold, now provides a certain amount of coke for heating houses and other buildings. And in the background is the 30 or 35 million tons of household coal consumed in its raw state.

How, asks Dr. Sinnatt, will the trends of the times affect the balance between these supplies of heat? There are all manner of influences at work, many of them opposing influences. As we have said, there is a growing public demand for a cleaner atmosphere. The tendency is to eliminate the unnecessary pollution of the air. The coal industry is aware of the increasing strength of this demand. Only a week or two ago we called attention in these columns to a smoke reducing coal fire produced by the Coal-burning Appliance Makers' Association and the Coal Utilisation Council in collaboration with the Gas Light and Coke Company. Already automatic stokers which deal with quite small quantities of coal and can be operated without the production of smoke are being installed in large numbers. A rough assessment indicates that the amount of coal burned in such plants is of the order of 750,000 tons per annum, and this development has taken place in some four years. This call for smokelessness has also led to the increasing use of gas, coke, and electricity; it has led, too, to the growing sales of low-temperature coke. It is, of course, only one of many influences. The public to-day demands a greater standard of comfort and convenience, a standard which is being reflected by the development of both the gas and the electricity industries. The habits of the people have undergone vast changes of late years. In comparison with the last generation it may be said that houses are less the homes in which we live than the places in which we sleep and have our meals; and the tastes and habits of the people rule out some forms of heating. The fact that gas, electricity, and central heating deliver a large proportion of their potential heat is only one reason why they are challenging the open fire.

Gas in Relation to Coke

We may mention one or two other factors at work having their bearing on the future prosperity of the Gas Industry. Central heating in offices has inevitably had the result of office workers expecting a greater measure of heat in their own homes—this applies to both men and women—and the thinner clothes which women wear to-day accentuates the demand. The passing from a warm room to a cold one is nowadays not tolerated as it was a comparatively few years ago. Another factor is the building of dwellings containing rooms without flues—a movement which finds favour in the eyes of the electricians, but which is surely harmful to health. Then there is the erection of small labour-saving houses and flats having inadequate space for the storage of solid fuel in any form.

Bearing in mind the numerous influences affecting the Gas Industry, Dr. Sinnatt points to the possibilities of the complete gasification of coal by oxygen under pressure. Could a gas of satisfactory characteristics be produced by this process at such a cost that in use it could compete economically with solid fuel, then we should have arrived at an ideal solution of the domestic heating

problem. Though it is right that our Industry should look ahead and investigate, as it is doing, the possibilities of complete gasification under pressure, the cold fact remains that there is a great discrepancy between the cost of therms in the form of coke and therms in the form of gas when, by present methods of carbonization, the cheapest gaseous therm is made. This was emphasized by Dr. E. W. Smith in opening the discussion on Dr. Sinnatt's Paper; it is a point we have stressed on many occasions in these columns. As things stand at present the cheapest gaseous therm is produced by the Industry as a result of the simultaneous production of smokeless solid fuel and a host of other valuable products. Dr. Smith's description is a happy one: "The Gas Industry is a coal processing industry in which the aim is to convert it into products of the maximum financial value, *cheap gas being the primary objective*." And Dr. Smith went on to ask who the Gas Industry's consumer is. Analysis of the national income shows that over 85% of the population were, in 1934, dependent on incomes of £5 a week and less. No industry, he quite rightly argues, catering for a national service can progress unless its primary object is to cater for the masses. To the majority of families the matter of a shilling or so per week in their fuel costs must be one of great concern. The Gas Industry to-day best caters for the masses by producing coke as well as gas.

Bureau of Economics Advocated

If, however, our Industry is to make the progress which it certainly can make, it needs the information, which it now lacks, concerning the domestic requirements for heat and light in the different classes of homes within the community. It is in regard to this that Dr. Smith puts forward an exceedingly pertinent suggestion—the setting-up of a "Bureau of Economics" within the Industry. We are convinced that the establishment of some such bureau as that envisaged by Dr. Smith would be of great benefit. Its purpose would be to study every phase of the Industry from an economic point of view. It would collaborate with government departments in carrying out surveys of domestic and industrial requirements for heat and light. It would study the real trend in connection with the coke-gas ratio, the relationship between costs of production and selling prices, the effect of changes in the tastes and habits of the consumer. So one could go on. Without such an organization, Dr. Smith maintains, and we are with him, "the Industry must be ill-informed and flounder." We hope that the British Gas Federation will investigate the suggestion.

"Background Heating"

Any thoughts on the future of the Gas Industry must, we maintain, include consideration of the elimination of sulphur compounds from town gas. This, of course, is one of the attractive features of complete gasification under pressure—in the purification process sulphur compounds are removed. We can visualize an immediate and an enormous development in the use of gas in the home if gas was supplied free from sulphur. Given such a gas, then what we may term the background heating load could be seriously tackled, and tackled with successful results to all concerned. We think the time is coming when there will be a much more general demand for some form of heating which will "take the chill" from a house, this heating being supplemented by localized radiant heating. This background heating could be economically achieved by burning a sulphur-free gas fluelessly. It must be remembered that the heating efficiency of flueless appliances is of a very different order from that of even the most modern gas fire, and that to burn gas fluelessly is tantamount to a substantial reduction in the price of gas. Surely the load to be gained justifies more serious efforts than are being made—except in comparatively few cases—at present to supply a sulphur-free gas.

Adjustment to New Conditions

In this issue of the "Journal" is a full report of the proceedings at the Annual Meeting last Wednesday of the South Metropolitan Gas Company, whose accounts were analyzed in our pages a week ago. This Meeting was memorable for the fact that it was the first for over half-a-century which had not been presided over either by Dr. Charles Carpenter or the late Sir George Livesey. Dr. Carpenter, unhappily, was taken critically ill last October, and, although his many friends rejoice in the knowledge that he has made steady progress since then, there was no question of his being able to attend last week's meeting. Thus, at a somewhat difficult juncture, Mr. Frank H. Jones, the Vice-President, found himself called upon to assume chief responsibility. His address from the Chair, and his conduct of the Meeting, were such as to receive the full approbation of the proprietors present, indicating, as they did, a complete grasp of, and a sympathetic attitude in regard to, the situation.

Largely, the circumstances with which the South Metropolitan Gas Company find themselves called upon to deal are those with which the Gas Industry in general is faced. The South London undertaking is under the same necessity to adjust itself to new conditions. Indeed, as Mr. Jones said, the effects of such an age of transition as this are perhaps most apparent in areas like that of his Company, which are already thickly populated throughout their length and breadth, and in which there is little virgin land to help new development. A large increase is shown in the value of up-to-date appliances taken on hire-purchase, and this must add still further to the stability of the Company's business, though Mr. Jones was careful to stress once again the fact that one of the things which lead to economy in the use of gas to domestic consumers is the greater efficiency of the appliances now made available to them.

Actually there was last year, as compared with the preceding twelve months, a small decrease of 1·12% in the quantity of gas supplied to the area served by the South Metropolitan Company, though developments in the South Suburban area caused that Company to require a larger quantity of gas in bulk than in the previous year, so that there was an increase in the gas sold by the South Metropolitan Company of 0·48% over that of 1935. Apart from any possibility of still greater demands for gas in bulk by the South Suburban Company, there is every chance of gains in the South Metropolitan area, for the Directors are adapting their sales and distribution policy to the altered conditions of to-day. In particular, they are mindful of the great opportunity presented by the extensive re-housing schemes on foot in many parts of the Company's area. In the meantime, the Company are to be congratulated upon having been chosen to complete the re-lighting of the whole of the Borough of Wandsworth that lies within their area of

supply—a length of streets amounting to 107 miles—and upon having received an order to re-light the major portion of the Borough of Lambeth, which lies almost wholly within their area. The new " Supervia " directional system of lighting is being installed, and those who have seen this lamp in action will not gainsay Mr. Jones's right to feel confidence in its ability to prove that, " if applied according to the latest scientific principles, gas gives place to no other form of lighting in its effectiveness," and in its power to provide an effective advertisement of the Company's chief product.

In his address, Mr. Jones made other interesting comments upon the business of the past year, but on the matter which was no doubt mostly in the minds of his audience circumstances prevented him from making any extended remarks. We refer, of course, to the introduction by the Company of a tariff system of charging for gas, which is at the present time engaging the attention of a Joint Select Committee of both Houses of Parliament. He was, however, able to point to the fact that the Board had decided (owing to unforeseen delay in the appearance of one of the parties before the enquiry) to refund to the consumers unconditionally, and at once, the moneys which had been collected during the operation of the tariff in excess of what would have been paid had there been no tariff, and that an appropriation from the Special Purposes Fund of £30,000 for this purpose had been made. It will be noted that, at the Meeting of the Gas Light and Coke Company, to which we refer below, Sir David Milne-Watson also felt impelled to limit himself to saying that his Company will be represented before the Joint Committee, and are prepared to give evidence if asked to do so—the Committee having been appointed not only to enquire into the powers of the South Metropolitan Company, but also into those possessed by all basic price companies.

A Happy Birthday

Later in the week—on Friday last—there followed the Meeting of the Gas Light and Coke Company. There were so many high lights in the Address of Sir David Milne-Watson to the proprietors that it will amply repay careful study, not only by the shareholders, but by all who may be interested in the great Gas Industry. By reason of the fact that the Gas Light and Coke Company are unique in the matter of size, certain considerations are naturally peculiar to them, but in the main the lines upon which they have so successfully moved are those suited to other enterprising undertakings.

In a changing world, some things there are which have been found so hard to improve upon that they have remained constant. For example, the Company lighted Pall Mall by gas in 1812, and their 125th birthday, this year, finds them still lighting it—a fact upon which, we venture to assert, Pall Mall is to be congratulated equally with the Company. Remarkable a century-and-a-quarter ago by reason of its novelty, street lighting by gas enjoys ever-increasing popularity to-day because of its efficiency. From the small beginning of Pall Mall in 1812, the Company have gone on until now the total number of street lamps installed and maintained by them has grown to over 52,000, and local authorities are still entering into the long-period contracts which are essential to justify the expenditure upon modern installations. For, as the Governor pointed out, public lighting is no longer the simple matter that it once was. With the traffic conditions of to-day, there are a great many technical questions connected with road lighting, but, " as far as the practical effect is concerned, whatever can be achieved by any other method can be achieved by gas lighting, which is sufficiently adaptable to yield any type and degree of illumination that is planned for it—without the need of introducing any graveyard effects or blue limelight." In other words, the Gas Industry is fully able to supply the steadily increasing demands for more and better public lighting that may be anticipated.

The accounts of the Company which were fully dealt with in last week's issue of the " Journal," and the extended report of the Governor's Address appearing on later pages to-day, tell what Mr. Henry Woodall rightly described as a " great story," and it is a story that holds as much promise for the future as of performance in the past. During 1936, the Company experienced an increase in gas sales of nearly $3\frac{3}{4}\%$—an increase to which both the ordinary and the automatic consumption contributed. Making all due allowance for the fact that the year provided so much " gas weather," and that Leap Year gave the advantage of an extra day, this gain, as the Governor pointed out, represents a genuine increase in the extent to which the public are using the Company's gas. On the face of it, an increase in gas sales of 3·69% may not seem a very spectacular figure, but the Governor indicated in a striking manner its real meaning. " We have," he said, " taken note of the total output and increased sales of electricity in our area, and have been able to make an extremely close estimate based on official sources of what the figures amount to. We find that your Company's sales of gas in 1936, expressed in terms of heat values, were about eight times the sales of electricity for heating, lighting, and cooking. This excludes the electrical sales for power purposes, which bear no relation to the activities of the Gas Industry; but, incidentally, our total sales were over three times the electrical sales for all purposes, including power. From this you will see that our additional gas sales of 3·69% means a good deal more than might appear. Actually, it represents an increase over three times as great as the increased electrical sales for lighting, heating, and cooking in the last year for which figures are available. If we include the coke sold on our area for purposes other than power production, we find that the increase in gas and coke sold, in terms of heat value, was over eight times the electrical increase for all purposes, and some twenty times the increase in electricity sold for lighting, heating, and cooking."

Increased Appliance Sales

One of the directions in which the world has shown the greatest change of recent years is in its attitude towards credit. Gone—and, we feel convinced, gone for ever—are the days when attainment marked the culmination of long, and often wearying, effort. In their place, we have a reversed order of things, under which attainment comes first—and the effort later. It is a change which modern trends favoured, if they did not actually necessitate, and it has provided facilities that, judiciously used, afford greatly improved conditions of home life. There are so many helpful and beautiful things to be had now which the wildest dreams could not have pictured far less than a century-and-a-quarter ago. Luxurious and highly efficient gas-consuming appliances are among them. But they cost money; and to-day there is no time for waiting. This it is which largely explains why the Company continue to require so much more capital. Unless they were

prepared to finance consumers to the extent of making it easy for them to acquire these up-to-date appliances, they would not be able to continue to progress as they have done in the past. This policy has met with such success that during the last year the Company sent out various gas appliances on hire-purchase to the number of over 270,000. The total number of appliances issued and installed during the year—at practically three-quarters of a million—was nearly 25% up on 1935.

And so the story continues, with but one cloud—the coal position, which is causing the Company considerable concern, and as to which the Governor said the "coalowners throughout the country would be well advised to realize that, long-suffering as we are as a nation, abuse of a monopoly in a commodity of vital importance will not be endured for any length of time, and that, unless they exercise in a reasonable manner the powers which have been conferred on them, there is bound to be trouble."

Coke Research

SEVERAL important conclusions have been arrived at as a result of the research carried out by the Midland Coke Research Committee, the value of whose work to the Gas Industry as well as to the coke oven industry is freely recognized. We direct attention to the Committee's Report of Progress during 1936 which is published in to-day's "JOURNAL," and would mention here three features of the Report which we regard as of outstanding importance. The first relates to the value of the presence, in a coking coal, of durain and fusain. The increased demand for metallurgical coke in recent years has been the greatest in the Midland area. In 1934 and 1935 the production of oven coke was greater than in 1929, when an earlier record production was achieved. The production of coal is, in effect, controlled by the demand for all qualities, and there has been a shortage of small coal of coking quality. In many cases deficiencies of coking slack have been made up by coking nut coal, but nut coal has been found to yield, in the Midland area, a coke inferior in quality to that yielded by slack coal from the same colliery. The Midland Coke Research Committee has investigated the reasons for this.

By coking, after crushing, the different commercial grades of coal from one colliery it was found that the "beans" yielded the weakest coke, the quality of coke then improving with the size of the nut coal coked. Even with large coal, however, the coke was still inferior to that made from slack. It was found that the shatter indices of the cokes made from sizes larger than slack were directly proportional to the amount of durain, which was present to the greatest extent in large coal and the least in "beans." It was possible to account for the superior quality of coke made from slack by its durain content, but, in addition, slack contains fusain which appeared to account for the improved quality of coke. Addition of hand-picked fusain to the small nut coals gave a coke equal in quality to that made from slack. A series of tests in which coke dust was added to "beans" of varying durain and fusain content and slack showed the effect of the coke dust addition to be the same in all cases. "This," states the Report, "has established the fact that, with a relatively high rank Yorkshire coal, the effect of the addition of durain, fusain, or coke dust is entirely different, separate, and additive. Deficiency of durain cannot be compensated by the addition of coke dust or fusain, while addition of fusain to a mixture containing the most coke dust which can be used without making the coke abradable effects a still further increase in impact hardness."

Another piece of work has been on the production of reactive coke in coke ovens. Coal was cleaned to 2% ash content and coked with a mixture of 0·5 to 0·75% of hydrated lime to fix the ash and 0·5 to 1·0% of sodium carbonate to activate the coke. These tests showed that undercarbonizing a low ash coal mixed with alkali produces reactive coke which compares favourably with coke made by low-temperature carbonization, for although a rather more intense ignition is required the fires last longer. "Such activated coke," it is observed, "may be lighted with a reasonable quantity of paper and sticks, burns up rapidly to give a bright fire, flames pleasantly in the grate, and may be used in sizes up to 3 in., whereas ordinary oven coke can rarely be used in sizes exceeding 2 in., and frequently the upper limit is 1½ in. The flexibility with regard to the size which may be used enables a small or a large fire to be used."

Finally we would mention the investigation on the swelling power of coal. The relationship between the swelling power of bright coal and its composition has been determined by plotting the results of about a hundred coals from various coalfields in Great Britain. It has been shown that the hydrogen content has a marked effect on swelling power, while the rank of a coal as defined by its carbon content is also important. An equation has been derived for the relationship between swelling power and carbon and hydrogen content, and a simpler equation gives a useful approximation which enables the factors governing swelling to be defined.

The Factories Bill

THIS Bill, to which reference was made in the King's Speech, has now been introduced into the House of Commons; it will be the principal contribution of the Government to the Social Legislation of the Session. With the attention of Parliament centred so largely on foreign affairs, and Budget day fast approaching, the desire of the Government that the Bill should have an easy passage to the Statute Book can be understood. At the same time, it is obvious that a measure affecting so materially the industrial life of the country will require the most careful consideration.

In to-day's "JOURNAL" will be found an article commenting upon the main provisions of the Bill in some detail. There is no doubt that many in the Industry will consider that the inspection of gasholders is a matter which could be regulative by voluntary agreement rather than by legislation. There is no one in the Industry who denies that gasholders should "be of sound construction and shall be properly maintained." The Bill provides that gasholders shall be inspected by a competent person, although no guidance is given as to the meaning of the words "a competent person." It is, however, gratifying to note that the slightly pro-electric note of the 1926 Bill has been abandoned, and it is particularly noteworthy that the Bill contains provisions making it impossible for the Home Secretary to prescribe whether artificial lighting is to be produced by gas, electricity, or any other particular means.

The Government have shown every disposition to meet the views of the employers and employees of all industries, and it cannot be doubted that with suitable modifications the Bill will prove a most useful piece of legislation.

PERSONAL

After 46 years with the Gas Light and Coke Company, of which 37 were spent at Fulham, Mr. A. H. SOLOMON has retired from the position of Station Engineer at Fulham. Mr. Solomon, who is a son of a late Superintendent of the Rental Department, entered the Company's service in 1891, as a pupil of the then Station Engineer at Fulham, Mr. Iago. In 1894 he was appointed Assistant to the Engineer at that Station, and later became Assistant Engineer. In 1907 he was transferred to Beckton, and two years later was appointed Deputy Engineer of that Station. This position he held for three years until 1912, when he was appointed Station Engineer at Shoreditch. After a short period at this Station, Mr. Solomon received the appointment of Station Engineer at Fulham in 1913, the position which he held until his retirement.

His retirement has been marked by the presentation of a number of gifts from the Directors, Engineers, and Chief Officers of the Company, together with some from all those associated with him for so long at Fulham.

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On Dec. 31 last, Mr. H. H. CREASEY retired from the position of Deputy Controller of the Gas Sales Department after a long career with the Gas Light and Coke Company.

Mr. Creasey joined the Company in a junior capacity 46 years ago, in 1890. Four years later he was promoted staff officer in the Inspectors' Department, which corresponded with what we now know as the Gas Sales and Distribution Departments, rolled into one. From the beginning Mr. Creasey has played a leading part in nearly every development which has characterized the growth of the Gas Sales Department. He was also a founder member of the London and Southern District Junior Gas Association.

In 1923, Mr. Creasey was appointed Manager of the Sales Development Section (later the Special Service Section, and now the Headquarters Sales Section), and in 1933 he was appointed Deputy Controller of Gas Sales, a position which he held until last Christmas.

In recognition of his long and valued service he has been presented with a grandmother clock and a bedroom suite by the Directors, the presentation being made by the Governor; also with a clock, an armchair, and a brooch for Mrs. Creasey by the Headquarters Sales Staff; and with a silver salver by the Local Managers and other members of the Gas Sales Department, the two latter presentations being made by Mr. Stephen Lacey, Controller of Gas Sales.

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On Jan. 1, Mr. H. C. HEAD retired from his position as Managing Director and Engineer of the Winchester Water and Gas Company. The Water Undertaking of the Company was purchased by the Winchester Corporation during the latter part of last year and the Southampton Gas Light and Coke Company took over the Gas Undertaking at the beginning of this year.

After a period as pupil of the late Frank Livesey, and subsequently Assistant to him in the South Metropolitan Gas Company, Mr. Head was appointed Chief Assistant Engineer to the Bournemouth Gas and Water Company. From there he went to Winchester in 1904. Under his management the Winchester Water and Gas Company increased in prosperity from year to year, and it has been learned that as a token of friendship and of his great appreciation of long and faithful service under his leadership he has personally given handsome presents to over forty of the Company's staff and employees to remind them hereafter of happy team work together. It is hoped that with improving health he will long be spared to enjoy his well-earned rest and retirement. He will continue to reside in Winchester for the present.

Mr. Head has a large consulting practice, especially in connection with various water works undertakings. He has been President of the Southern Association of Gas Engineers and Managers; President of the Institution of Water Engineers; and Ordinary Member of Council of The Institution of Gas Engineers. He was the first Chairman of the British Road Tar Association, for the formation of which he was largely responsible; a Member of the Central Committee of the Associated Chambers of Commerce, and Chairman of the Winchester Chamber of Commerce, &c.

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Lord GRIMTHORPE has been appointed Chairman of the Directors of the York Gas Company in the place of Mr. C. B. JOHNSON, who has resigned.

One of the leading figures in Yorkshire, Lord Grimthorpe devotes his time to a variety of interests—business, political, military, sporting, and social. In business he is a partner in the banking firm of Messrs. Beckett & Co. (Westminster Bank). He is also Chairman of Airspeed, Ltd., Portsmouth.

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In *West's Gas* for January we read of an interesting little ceremony which took place at Manchester on Dec. 18 last when Mr. Arthur Speakman (Chairman of the Works Committee) presented Sir FREDERICK and Lady WEST with a period oak pedestal clock and a mahogany mantelshelf clock, with silver panels carrying appropriate inscriptions, as an assurance of the constant goodwill and esteem with which the employees of the Company regard them.

Acknowledging the gifts, Sir Frederick remarked that he had received many evidences of the loyalty and affection of those who formed the " family " of West's Gas Improvement Company. And in this presentation he had not only gained a further overwhelming assurance of this loyalty and affection, but also had acquired a notable addition to his collection of treasured possessions. Lady West also expressed her thanks for the gift.

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Mr. FRANK WILKINSON GROUNDS, of Warrington, has been appointed Technical Assistant to the Chorley Borough Gas Engineer.

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Mr. L. R. COWLEY has been appointed to the position of Works Superintendent to the Cheltenham and District Gas Company. Mr. Cowley was a member of the staff of the City of Coventry Gas Department for a period of six years, subsequently entering the service of the Shipley Gas Department where he has been engaged for the past 13½ years.

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At the first meeting last week of the Board of Directors of the Guildford Gas Light and Coke Company as reconstituted following the acquisition of control by Associated Gas and Water Undertakings, Ltd., Mr. E. L. NICHOLAS, Engineer, Manager, and Secretary, received and accepted an invitation to become a Director of the Guildford Company. Many friends will wish to offer Mr. Nicholas their congratulations.

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Mr. JAMES FLETCHER has been appointed Chief Assistant Gas Engineer to the Wallasey Corporation.

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In their report for the year 1936, just issued, the Directors of the Reading Gas Company announce the appointment of Mr. G. S. DUNSTER, formerly Assistant Secretary, to succeed the late Mr. A. B. Stedman as Secretary of the Company.

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Mr. C. C. PENFOLD has been appointed Sales Manager of the Gas Fire Department of Bratt Colbran, Ltd.

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In last week's issue we recorded the appointment of Mr. E. LONGBOTTOM as Showroom Manager to the Chesterfield Corporation Gas Department. We regret having been misinformed in this matter; Mr. Longbottom's position at Chesterfield is Retail Sales Manager.

Obituary

Mr. JAMES STARK, J.P., O.B.E., Hon. Sheriff-substitute for Fife, and a Director of Cupar Gas Company, died on Jan. 31.

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The Scottish Junior Gas Association (Eastern District) have lost an enthusiastic member by the death of Mr. WILLIAM DUFF, of Edinburgh, in his 78th year. Mr. Duff entered the service of the Edinburgh and Leith Gas Commissioners in 1882 and retired from the position of Shift Foreman under the Edinburgh Corporation Gas Department in 1922 after completing 40 years' service. His membership of the Association dated back to 1910 and included a period of service on the Council. He was elected an Hon. Member in 1928. He took the keenest interest in the affairs of the Association, and his last appearance with them was at the Outing of May last year.

Correspondence

Hop Drying by Gas

SIR,—I should be obliged if you would give me space in your columns to comment on Mr. Winter's letter, which appeared in the "JOURNAL" last week.

It seems that Mr. Winter's objection centres round the suggestion of "risk of spoilage." Among the "proofs" of the non-existence of such risk in the case of the direct-fired type of oil heater, he quotes Lloyd's insurance rates against contamination. This, I believe, would be an acceptable enough indication to anyone that risk does in fact exist.

Yours, &c.,
A. H. BIRD.

Watson House,
Fulham, S.W. 6,
Feb. 8, 1937.

Lighting and Apathy

SIR,—I have read with interest the leading article in the "GAS JOURNAL" of Feb. 3 which relates to public lighting, and must confess I am entirely in agreement with you that in many instances apathy is displayed on the part of the Gas Industry in dealing with public lighting.

It is only necessary for the electricity industry to displace inferior gas lighting in order for them to solicit public favour with their system of lighting.

I should like to point out that the Hereford City Council have recently accepted a comprehensive scheme involving a capital expenditure of £5,000 for re-lighting by gas some 8-10 miles of main roads, and further that they have in mind following this up by improved lighting of secondary roads. This is following on the high-pressure lighting which has been installed during the past two or three years, and which certainly has had the effect of keeping the public gas-minded, as far as street lighting is concerned.

I may say that all our schemes have been worked out in accordance with the British Standard Specification.

Yours, &c.,
ARTHUR ROBERTS,
Engineer and General Manager.

Corporation Gas-Works,
Hereford,
Feb. 8, 1937.

Gas Films

The B.C.G.A. Organize Available Resources

With the availability to-day of a series of excellent propaganda films—several of which were reviewed in the columns of the "JOURNAL" last October—the B.C.G.A. have lately co-ordinated this new branch of activity by the organization of a film service which will be of general interest and advantage to the Industry. It is now fairly generally recognized that, with the growing popularity of this form of publicity, films have definitely taken their place among the essential advertising schemes of many gas undertakings; and the Association have therefore now completed arrangements whereby the latest type of portable projection apparatus, the services of expert operators, and a programme of films of an undertaking's own choice are available to all members, irrespective of locality. All that is necessary is to ask the B.C.G.A. to tell the local manager of the Road Show Service to get into touch with the undertaking, and he will furnish full information regarding the use of the films and discuss individual requirements. A particular advantage of this scheme lies in the fact that those who wish to organize film displays need not concern themselves with technical details, police permits, licences, or other items which might well render the show not worth the trouble and effort entailed. As it is, the Road Show Service attends to all these matters.

When shown by the Road Show Service the films are loaned free of cost from the B.C.G.A. Film Library, a modest charge being made for the provision of the necessary equipment and operating staff according to the number of exhibitions required or the number of days involved. The charge differs according to whether the films are to be exhibited to specially invited audiences or to existing audiences, such as women's guilds, local institutes, schools, &c. —that for the latter group including posters and leaflets over-printed with the name of the gas undertaking and the time and place of the show. It also includes, if desired, the arrangement of the programme. The local Road Show Managers are provided with albums illustrating suitable literature for distribution, while the Association also supplies a four-page programme brochure entitled "Four Films about Things that Matter," which is useful in bringing the films to the notice of secretaries and organizers of "existing audiences." Such brochures are issued to the undertaking or the local Road Show Manager according to who is arranging the programme.

This new B.C.G.A. service, which is outlined in detail in an attractively produced pamphlet, also incorporates suggested programmes of films for different classes of audiences—though the final choice is, of course, left with the undertaking. The Association intend to publish news of special interest in connection with these films in their monthly *Bulletin*. These items will be concerned in the main with original exploitations of the films, and these will be of value to members who are planning how they can best take advantage of the film service in their respective areas. Conversely, any news which members can let the Association have concerning their own experience with film exhibitions will be helpful to others.

Those gas undertakings who are already convinced of the useful part film propaganda can play in their publicity efforts will welcome this new service, while it will, in addition, enable those who still entertain any doubts on the matter to give the scheme a fair trial at little cost or trouble to themselves.

Forthcoming Engagements

Feb.

12.—LONDON AND SOUTHERN JUNIORS.—Paper by F. O. Hawes, "The Effects of Changes in Composition upon the Combustion of Town Gas."
13.—SCOTTISH WESTERN JUNIORS.—Debate Meeting.
17.—B.C.G.A.—Meeting of Executive Committee, 11.30 a.m.
18.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—Meeting at Gas Industry House, 2.30 p.m.
18.—JUNIOR ASSOCIATIONS.—Visit to B.I.F., Birmingham.
20.—WESTERN JUNIORS.—Meeting at Bath; Paper by F. G. Craxford, "The History and Development of Gas Fitting."
22.—WOMEN'S GAS COUNCIL.—Executive Committee, 11.30 a.m.; General Consultative Committee, 2.30 p.m.
23-25.—B.G.F.—Joint Gas Conference at the B.I.F., Birmingham.
26.—I.G.E.—Gasholder Committee, 2.30 p.m.
27.—SCOTTISH JUNIOR ASSOCIATION.—Joint Meeting at Edinburgh; Paper by F. B. Holmes, "Scrubbers."

(There will be no meeting of the Central Executive Board of the National Gas Council during the month of February.)

March.

3.—S.B.G.I.—Council Meeting, 2.30 p.m.
4.—MIDLAND JUNIORS.—Paper by H. Wynne (Burton-on-Trent).
9.—N.G.C.—Central Executive Board Meeting, 2.30 p.m.
10.—LONDON AND SOUTHERN JUNIORS.—Visit to Teape & Co., Paper Mills, Dartford.
11.—MIDLAND ASSOCIATION.—Annual General Meeting, Grand Hotel, Birmingham, 2.30 p.m.
12.—MANCHESTER ASSOCIATION.—Annual Luncheon, Midland Hotel, Manchester, 1 p.m. Mr. R. N. Webb will subsequently read his Presidential Address.
13.—SCOTTISH WESTERN JUNIORS.—Visit to Glenboig Brickworks.
16.—SOUTHERN ASSOCIATION.—General Meeting at Hotel Victoria, Northumberland Avenue, W.C. 2, 2.30 p.m.
17.—MANCHESTER DISTRICT AND YORKSHIRE JUNIORS.—Joint visit to Stanton Ironworks Company, Ltd., Derby. Paper by T. H. Wilson, "The Manufacture of Cast-Iron Pipes."
19.—LONDON AND SOUTHERN JUNIORS.—General Discussion Evening.
20.—WESTERN JUNIORS.—Visit to Exmouth Gas-Works. Paper by K. G. Bodiley, "Modern Methods of Street Lighting."
20.—WALES AND MONMOUTHSHIRE JUNIORS.—Meeting at Cardiff. Paper by H. V. Williams, "Mains and Services."
27.—SCOTTISH WESTERN JUNIORS.—Annual Business Meeting. Paper by Dr. Davidson, "Domestic Coke."
31.—LONDON AND SOUTHERN JUNIORS.—Visit to Davis Gas Stove Company, Ltd., and Electrolux, Ltd., Luton.

News in Brief

CURRENT EVENTS IN THE GAS INDUSTRY

For the Extension of gas-compressing plant, the Wallasey Gas Committee is to make application for sanction to borrow £1,000.

Approval Has Been Given to a proposal of the Blackburn Gas Committee to reduce the charges for gas supplied to the Railway Station and other railway premises.

A Further Repeat Order has been received by Gas Chambers and Coke Ovens, Ltd., for an extension of 30 Collin coke ovens to their plant at Fence Houses from the Lambton Hetton and Joicey Collieries, Ltd.

Sanction of the Ministry of Health has been received by the Lincoln Gas Department to borrow the sum of £23,000 for alterations and additions to carbonizing plant at the gas-works. The contract has been placed with the Woodall-Duckham Company.

Applications are Invited from qualified engineers for the position of Engineer and Manager to the Salford Corporation Gas Department. Further particulars of this appointment—which carries a salary of £1,000 per annum—will be found in our advertisement columns.

The Relative Merits of Gas and Electricity for lighting, heating, and power were debated at a meeting of Clitheroe Rotary Club on Feb. 4 by Mr. R. W. Harris, Assistant Manager to the Corporation Gas Department, and Mr. A. H. Todd, Manager of the Corporation Electricity Department.

By 22 Votes to 11 the Aberdeen Town Council on Feb. 1 adopted a recommendation by the Finance Committee that in housing schemes in the city electricity be used for light and gas for cooking and wash boilers. The Committee turned down a proposal to substitute electric cookers for gas cookers.

The Tender Has Been Accepted by the Lurgan (Co. Armagh) Urban Council of Messrs. Robert Dempster & Sons, Ltd., of Elland, for a three-lift spiral-guided gasholder of 400,000 cu.ft. capacity. The Ulster Ministry of Home Affairs is to be asked to sanction a loan of £11,000 for the purchase of the holder.

An Assistant Engineer and Manager is required by the Exmouth Gas Company, who invite applications in our advertisement columns this week from those with experience of "W.-D." verticals, mechanical and electrical plant, C.W.G., and a knowledge of gas-works chemistry. The post carries a salary of £300 per annum.

The Transactions of the Australian Gas Institute for 1934-35, a copy of which we have just received from the General Secretary, Mr. James Harrison, contains reports of the eighth annual convention of the Institute held at Manby under the Presidency of Mr. A. H. Smedley and of the eighth and ninth annual sectional meetings held in Sydney and Melbourne.

A Lecture on "The Historical Development of Coal Carbonization in the Gas Industry" was delivered by Mr. E. T. Pickering, of the Birmingham Gas Department Central Laboratory, Nechells, to members of the Birmingham Scientific Society at the Midland Institute on Wednesday night, Feb. 3. Mr. Pickering's lecture was illustrated by lantern slides.

After Eight Years of Exile gas is once again lighting the streets in that part of Farington served by the Leyland Gas Company. In 1929 the Parish Council decided to replace gas by electricity; now the same body has entered into a ten years' contract with the Gas Company for street lighting in their area. At the moment the two systems stand side by side, and the four-light Sugg "Windsor" lanterns, set on 14-ft. columns, illuminate the disused electric standards.

The Ulster Local Government Auditor, reporting on the audit of Lisburn Gas Department, stated that for a period of five years, including the year under review, the Council had succeeded in avoiding having recourse to borrowing on behalf of the Undertaking, while maintaining the plant in a state of efficiency. A continuation of that policy, coupled with the fact that the former loans were being steadily paid off year by year, must result in the Undertaking becoming a very valuable asset to the Council. The loan debt stood at £37,155 while at the same time the balance in favour of the revenue account was £6,752.

Details of a Ten Years' Plan for the improvement of street lighting by gas at Hereford were submitted to Hereford City Council and passed at their last meeting. The Gas-Works and Lighting Committee estimated that the total cost of installation would be £4,982, and the additional cost £1,354. The Committee recommended that the scheme should be carried out on capital account over a period of years. Certain wage increases for gas-works employees were also approved.

The Annual Report for 1936-37 of the National Smoke Abatement Society mentions that during the year under review an appeal was made to the principal local authorities not already affiliated to the Society. It has so far resulted in the affiliation of 42 new authorities, making the total number affiliated now 105. This is still a relatively small number but includes nearly all the larger towns and cities and others seriously affected by smoke. The combined population of the affiliated authorities is over 13,500,000, or more than one-third of the population of England and Wales.

The Benefits of Cheap Gas were discussed on Feb. 4 at the annual dinner of the Scottish Wirework Manufacturers' Association in Glasgow. Sir David Allan Hay, the Commissioner for Special Areas in Scotland, said that if the Board of Trade Committee produced a scheme for producing more steel in Scotland and Glasgow Corporation were prepared to take the coke oven gas thereby made available from pig iron production, the difficulties of the Special Areas would be partially solved. Industrialists more and more were using gas in their commercial products and a cheap supply of coke oven gas would attract industry to areas where steel was manufactured.

At the Last Meeting of the Belfast Gas Committee, Mr. J. D. Smith (Engineer and Manager) reminded the Committee that the Ministry of Home Affairs had sanctioned a loan of £100,000 to meet expenditure on mains, services, stoves, meters, lamps, machinery, and plant, and, during the year ended March 31, 1936, expenditure on these items had been incurred amounting to £65,975, leaving a balance of £34,024, which, he anticipated, would be expended before the end of the present financial year. He recommended that, subject to the approval of the Finance Committee, the Council be recommended to apply to the Ministry for sanction to the raising of a further loan of £100,000.

Gas Company Dividends

Metropolitan Gas Company (Melbourne).

The London Agents for the Metropolitan Gas Company of Melbourne (William Coward & Co., Ltd., of 3, St. James's Square, S.W. 1) announce that they have received notification from their Principals to the effect that the Directors have declared an interim dividend at the rate of 6s. 6d. per share, payable on Feb. 15.

Watford.

The Directors of the Watford and St. Albans Gas Company have recommended a final dividend for the year ended Dec. 31, 1936, on the ordinary stock at the rate of £3 10s.%, making a total dividend of £7%, the same rate as that paid in 1935. The sale of gas has increased by 7·64%, which is the largest increase for many years, and an additional 12,000 pieces of apparatus have been fixed in consumers' houses during the past year.

Industrial Gas Centres Committee

The Technical Sub-Committee of the Joint Co-ordinating Committee has now been re-christened the Industrial Gas Centres Committee.

Its members are: Messrs. B. J. Bell (Cardiff), C. C. Brice (Bristol, representing Mr. N. S. Smith), D. Chandler (London), W. Dieterichs (London, Chairman), W. R. Drummond (Glasgow), A. W. Field (Leeds), R. Halkett (Sheffield), H. R. Hems (Birmingham), W. F. Howell (Manchester), E. A. Leask (Leeds), P. Lloyd (London), H. P. Lupton (Liverpool), T. H. Pardoe (Stretford), Dr. C. M. Walter (Birmingham) and J. E. White (Newcastle-upon-Tyne).

Amalgamation and Grouping

Clevedon and Yatton.

Application is intended to be made to the Board of Trade for a Special Order under the Gas Undertakings Acts, 1920 to 1934, by the Clevedon Gas Company with the object *inter alia* of acquiring the Undertaking of the Yatton Gas Consumers' Company, Ltd.

Newcastle-upon-Tyne and South Shields.

At a special meeting of shareholders of the South Shields Gas Company, to be held at the Company's offices, South Shields, immediately after the annual meeting, on Feb. 23, ratification of a provisional agreement between the Newcastle-upon-Tyne and Gateshead Gas Company and the South Shields Gas Company will be recommended.

The agreement provides for the payment of compensation to the Directors, Secretary, and Auditor of the South Shields Gas Company for loss of office. The suggested merger will place Tyneside's gas supply under unified control, the South Shields Undertaking being the only domestic gas-producing concern operating independently of the larger Company.

United Kingdom Acquires Four More Companies.

It is announced that the United Kingdom Gas Corporation has acquired further gas undertakings as follows:

87·8% of the ordinary stock of the Normanton Gas Company.

91·32% of the ordinary capital of the Kippax and District Gas Company, Ltd.

100% of the ordinary capital of the Sherburn and South Milford Gas Company, Ltd.

88·83% of the ordinary capital of the Farnworth and Kearsley Gas Company.

The acquisition of the above four Companies is in accordance with the programme for the establishment of a Gas Grid in Yorkshire and the linking up of gas undertakings in the Lancashire area.

Gas Instead of Electricity

Hinckley Council's Street Lighting Change

The question of gas or electricity for street lighting at Barwell was discussed at a recent meeting of the Hinckley Urban District Council. It was eventually decided to substitute gas for electricity.

Reporting upon the proposed change in the method of lighting Barwell streets, the Gas Committee reported that a letter had been received from the Deputy Manager of the Leicestershire and Warwickshire Electric Power Company to the effect that they had already made arrangements to erect three sample fittings on existing standards in Barwell, and they would like to proceed with the erection of these without any obligation whatever on the part of the Council. The Deputy Manager in his letter had stated that his Company would like to have the opportunity of putting before the Council a quotation for the continuation of the lighting by electricity, which would include the improved new type of fitting.

The Committee had come to the conclusion that no object was to be gained in entertaining the Power Company's application, and resolved that the letter lie on the table. The Gas Manager had produced to the Committee a statement on the cost of lighting by gas in Barwell and it had been decided to refer this to the Lighting Committee.

Mr. F. Burton, in supporting the Committee's recommendation, said he did so from a progressive standpoint. They would find, he said, that authorities up and down the country were changing from electricity to gas. He ventured to suggest that if the costs were gone into the cheapest and most economical system would be gas. Mr. Coley said the most economical way of lighting any town or city was by gas. The finest lighted district in the country, New Street, Birmingham, was lighted by gas.

Mr. J. Bennett, Chairman of the Gas Committee, said recently they had a gas exhibition at Barwell and people remarked that that was the kind of lighting they wanted. "Look at Leicester, what are they doing there?" Mr. Bennett asked. "What have they at Birmingham—gas, look at Westminster—gas," he added. It had been said that Hinckley was badly lighted. He would like the members to go to Birmingham and Leicester and see the side streets there. People who had been there had said that Hinckley was the best lighted town they had seen.

Institution of Gas Engineers

1937 Examinations

The Examinations of The Institution of Gas Engineers in Gas Engineering will be held on April 24, and in Gas Supply on May 1. The Oral Examinations will be held in London on June 23.

Forms of Application for External Candidates can be obtained from the Secretary of the Institution and have to be returned to him not later than Feb. 27.

Charles Hunt Memorial Medals.

Candidates for the Diploma Examinations in Gas Engineering (Manufacture) and Gas Engineering (Supply) are eligible for the award of the Charles Hunt Memorial Medals.

The Diploma in Gas Engineering (Manufacture) or (Supply) and the Higher Grade Certificate in Gas Engineering will admit to Corporate Membership, the Higher Grade Certificate in Gas Supply to Associateship, and the Ordinary Grade Certificate in Gas Engineering or Gas Supply to Studentship of the Institution, provided the other conditions under the By-Laws are fulfilled.

Forms of Application for Admittance to the Institution and copies of the Royal Charter and By-Laws can be obtained from the Secretary of the Institution, 1, Grosvenor Place, London, S.W. 1.

Education Calendar, 1937.

The following dates are of special interest to Examination Candidates, who are reminded that the Gas Education Committee meets on the third Tuesday in every month to consider applications from students received during the preceding calendar month:

FEB. 27.

Last date for receipt of applications to sit for Diploma Examinations and Ordinary and Higher Grade Examinations in Gas Engineering and Gas Supply.

APRIL 2.

Last date for receipt of Diploma Theses.

APRIL 24.

Examinations in Gas Engineering—
Ordinary Grade, 2–5 p.m.
Higher Grade—Part I., 2–5 p.m.
Part II., 6–9 p.m.
Diploma Grade—Part I., 2–5 p.m.
Part II., 6–9 p.m.

MAY 1.

Examinations in Gas Supply—
Ordinary Grade, 2–5 p.m.
Higher Grade—Part I., 2–5 p.m.
Part II., 6–9 p.m.
Diploma Grade—Part I., 2–5 p.m.
Part II., 6–9 p.m.

MAY 28.

Last date for receipt of Examination Results in Ancillary Subjects.

JUNE 23.

Oral Examinations in London.

JULY 21.

Publication of Examination Results, prior to which information as to individual results will not be available.

Invitation to R.S.I. Meeting

Members of The Institution of Gas Engineers are invited to attend the Sessional Meeting of the Royal Sanitary Institute which will be held at the Institute, 90, Buckingham Palace Road, S.W. 1, on Thursday, Feb. 18, at 2.30 p.m., when a discussion on "The House as a Home: Design, Construction, and Equipment as they affect Comfort" will take place.

Those proposing to attend this meeting are requested to notify the Secretary of the Institute not later than Feb. 11, 1937.

Progress at Swindon

Go-Ahead Policy

The Directors of the Swindon United Gas Company are pursuing their go-ahead policy by deciding on further important development schemes.

It has just been decided to lay 6½ miles of iron mains from Swindon to the adjacent town of Wootton Bassett, and nearly 13 miles of high-pressure steel mains through various villages, on to Lechlade and Fairford (Gloucestershire). The total cost of these schemes is estimated at £18,000. With these extensions the Company will be controlling a total of 140 miles of mains, linking up most of the important centres and intervening villages within a considerable radius of Swindon.

Progress continues on an almost phenomenal scale, the increase in gas consumption last year for Swindon alone

having been 60 million cu.ft. compared with the hitherto record year of 1935. Compared with the previous year, the average price of gas shows a drop of 4d. per 1,000 cu.ft. In the past five years the numerous reductions in price have equalled 1s. 1d. per 1,000 cu.ft., equivalent, on the Company's present output, to more than £15,000 per annum. This is more than the Company pays in dividend.

New Rifle Range for Stratford Rangers

Mr. R. W. Foot Fires the First Shot

The Gas Light and Coke Company have always taken a great interest in the Territorial Army, and especially in the Rangers, who have as Hon. Colonel the Governor of the Company, Sir David Milne-Watson.

Twelve years ago the Governor and Directors decided to offer special facilities to those of their employees who joined the Territorial Army, and made an appeal to the men at Beckton to join the Rangers and so renew the honourable connection between the Company and the Regiment which had existed for many years before, and during, the war. In response to this appeal 140 Beckton men joined "C" Company.

In the following year "C" Company at Beckton expanded into "C" and "D" Companies, and before long "A" Company was formed from employees at the Nine Elms Gas-Works. Still later platoons were formed at the Stratford and Bromley Works, and owing to the widespread interest taken in the Regiment by all departments, about 85% of the Rangers are now recruited from employees of the Gas Light and Coke Company. At all these different places the Company have provided accommodation for training and offices, and also rifle ranges, and it is to serve the needs of the Stratford and Bromley platoons that this new range has been opened by the Company, and has been fully equipped not only for target shooting but for miniature range field firing.

For a long time there has been a very strong Sports Club at Stratford Works, and the opportunity has now been taken to add to its many and diverse activities a very lively rifle section, which has been duly registered with the Society of Miniature Rifle Clubs. It is intended that the Club will enter the Essex league, and other competitions under the auspices of the S.M.R.C.

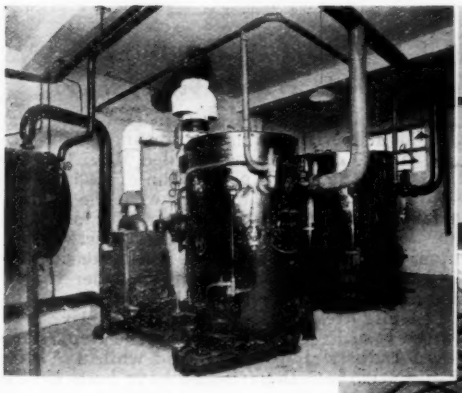
After firing the first shot, which was well inside the "black," Mr. Foot said how pleased he was, on behalf of the Governor and Directors, to open the new range, and to hand it over to the joint control of the Sports Association and the Rangers. This was one more link between the Company and the Rangers, and he hoped that the friendly co-operation in the use of the new range would lead to many more recruits. The Company took a keen interest in the recreation of its employees, and liked to see as many of them as possible making full use of the facilities which were provided. They were very proud of the Rangers, and he was anxious to see not merely the present Battalion brought up to full strength, but for two strong Battalions to be recruited from the Company. He would like to thank General Sir Walter Kirke, Col. Balfour, and Col. Dunlop for sparing some of their valuable time in order to honour them with their presence.

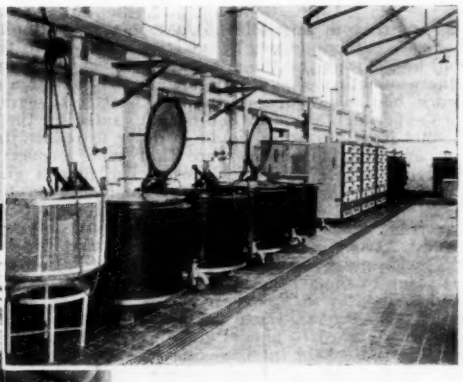
General Sir Walter Kirke, in reply, said that as Director-General of the Territorial Army he welcomed the very fine lead which the Gas Light and Coke Company had, for many years, given to other employers. This new and magnificent range was the latest example of the splendid facilities which they gave to their employees, and he would like to thank them for their generous and unfailing support to the Territorial Army as a whole and to the Rangers in particular.

A demonstration was then given, under the direction of Capt. Bertram, of how the field firing sand target can be used for training section commanders in leadership, description of ground, and fire control.

Among those present at the opening ceremony, including those already mentioned, were: General Sir Walter Kirke, K.C.B., C.M.G., D.S.O. (Director-General of the Territorial Army); Col. E. W. S. Balfour, D.S.O., O.B.E., M.C. (Colonel, The Scots Guards, Commanding the 3rd (London) Infantry Brigade); Capt. G. W. F. Stewart (Staff Captain, London Division); Lt.-Col. J. K. Dunlop, M.C., T.D. (Commanding the Rangers); Lt.-Col. F. M. Potter, O.B.E. (Second-in-command); Capt. D. R. C. Boileau, 60th Rifles (Adjutant, Rangers); Capt. D. C. Bertram (Commanding "C" Company); Mr. T. H. Wallington (Station Engineer, Stratford, and President Stratford Sports Club); Mr. E. V. Wright (Secretary, Gas Light and Coke Company's Sports Association), and Mr. C. D. Wall (Secretary Gas Light (Stratford) Rifle Club).

BRITAIN'S BIGGEST KITCHEN IS ALL-GAS





Our photographs show some of the gas appliances in this huge kitchen which is capable of providing no fewer than 10,000 meals per hour.

What is claimed to be the largest capacity kitchen in Great Britain was opened in Liverpool on Friday, Feb. 5, by Mr. Geoffrey Shakespeare, Parliamentary Secretary to the Board of Education. It has been erected to take the place of the six kitchens in use hitherto, and will be able to supply 10,000 meals in an hour. At the present moment it is providing 4,500 meals each dinner hour for necessitous Liverpool school children. These meals are placed in metal containers and taken by motor vans to 25 different meal centres throughout the City. The efficiency of the containers is such that only one degree of heat is lost in transit.

This new all-gas kitchen contains 12 boiling pans, with a total capacity of 1,000 gallons, 11 being heated by steam generated by two gas-fired steam boilers, giving 3,000 lbs. of steam per hour. The 15 ovens include a double-deck confectioner's oven and central range. There are also seven steamers, while hot water is supplied from a 600-gallon storage cylinder. Ten gas radiators heat the staff-rooms and stores.

The whole of the gas equipment has been supplied and fitted by the Liverpool Gas Company.

The Gas Industry and Phenol Supplies

Question of National Emergency

A Symposium on Plastics, organized by the Institute of Plastics Industry, was held at the Institution of Mechanical Engineers, London, on Friday, Jan. 28, and continued from 3 o'clock until 8.30 p.m. The Chair was taken by Mr. W. A. S. Calder, in the absence of Dr. Herbert Levinstein. Major F. D. Maclean, Chairman of the Institute of Plastics Industry, was also present.

It was made clear that the object of the Symposium was to place on record an account of the present position of the plastics industries, the uses to which plastics materials are put, figures of production and use, and, finally, to emphasize the national importance of the plastics industry in time of national emergency and in some way to bring to the notice of the Government Departments concerned the necessity for taking steps to ensure adequate supplies of the necessary raw materials in such circumstances.

We give a few notes of references that were made to the Gas Industry.

Mr. GEORGE DRING (Bakelite, Ltd.), who dealt with phenolic and cresylic types of plastics, pointed out that the most important raw materials for the manufacture of phenol-formaldehyde products were phenols and cresols, formaldehyde, wood, flour, paper, and fabric materials. During the past year the prices of cresylic acid had risen steadily due to heavy buying in the international market by foreign countries for purposes which one could only guess, and although so far there had not been a shortage of raw materials for the plastics industry, prices had increased by more than 50%. It was very difficult to get accurate figures of raw materials and manufactured products, and the latest he had been able to find were for 1933, which showed a total of about 7,000 tons of carbolic acid and crystals and 16,000 tons of cresylic acid. In the same year, 1,634,143 tons of tar were distilled in England and Wales which should give 16,341 tons of phenol, 24,511 tons of cresols, and 24,511 tons of xylenols. If this calculation was even approximately correct there seemed to be a big margin between the amounts which might be obtained and the amounts which were actually available in this country.

In America, practically the whole of the phenol used was synthetic phenol derived from benzole, either by the chlorine process or the sulphonic acid process. In this country there was practically no synthetic phenol on the market, although it was understood that at least two plants were available here for the manufacture of synthetic phenol at almost a moment's notice. The figure of 15,000 tons, the approximate present sales of phenol-formaldehyde materials in this country, would involve the use of 7,500 tons of phenols and cresols, but figures had been given by Dr. Levinstein in his Address to the Plastics Section of the Society of Chemical Industry in 1933 which showed that the possible production of benzole in this country was of the order of 150,000 tons, which could be converted into about the same quantity of phenol, and was about 20 times the quantity of phenols and cresols which the industry used in a year at present. He urged, therefore, that strong representations should be made to the Government to find out the position and to ensure that in any scheme for the distribution and usage of benzole, the importance of plastics materials in time of war should be realized and the necessary supplies of benzole allotted for the production of synthetic phenol. A considerable amount of work had been done during the past few years, and one or two experimental plants had been operated for the extraction of phenol from gas-works liquor in order to reduce its polluting effect, and the indications were that such recovery could be carried out at an economical cost. The figures given in the Report of The Institution of Gas Engineers on this subject showed that one ton of coal gave an amount of ammoniacal liquor from which roughly 0·0006 ton of phenol might be recovered. At one time there was a hope that the larger yield of tar acids given by low-temperature distillation would be of great value to the synthetic resin industry, but so far they had proved useless for that purpose.

Mr. F. M. POTTER remarked that the views held by some people with regard to phenol and the Gas Industry were something like those held in some quarters concerning the by-products of gas manufacture. Some people thought that the revenue from by-products paid for the whole cost of gas making, which was by no means the case. Although there might be tons and tons of phenol to be obtained from waste ammoniacal liquor, there was not a great deal of profit to be made from it.

Commander C. BUIST (Low-Temperature Carbonisation, Ltd.) sent a letter in which he put forward the claims of the low-temperature carbonization industry in connection with the production of phenol, remarking that some fractions of oil produced by low-temperature carbonization had a content of crude phenol as high as 48%. The output of his Company for 1937, he said, would probably exceed 5,000 tons of refined tar acid, and he also suggested that this quantity would be doubled in five years' time. At the present time most of the output of his Company was being exported to America for use in the manufacture of disinfectants and in connection with ore flotation processes, and no appreciable quantity was finding its way into the plastics industry.

At the conclusion of the discussion the question of making representations to the Government urging them to take steps to ensure an adequate supply of raw materials for the plastics industry, in the event of a national emergency, was dealt with. The general view was held that it would be unwise to go direct to the Government in this matter, and eventually, although a formal resolution was not passed, it was agreed that the British Plastics Federation, the Society of Chemical Industry, and other interested organizations should be asked to go into the matter and take such further steps as they might think necessary.

Women's Gas Council

Bexleyheath Branch.

The Inaugural Meeting of the Bexleyheath Branch of the W.G.C. was held on Wednesday, Jan. 27, at the showrooms of the South Suburban Gas Company.

Mr. T. Brown presided over a large gathering of women who were addressed by Miss K. M. Halpin. After a formal proposal that a Bexleyheath and District Branch be formed 97 members were enrolled and a Committee elected.

Manchester Branch Entertained to Film Show.

A Special Film Show was given at the Regal Cinema, Manchester, on Monday, Jan. 25, for members of the Manchester Branch of the Women's Gas Council, under the auspices of the Empire Tea Market Expansion Bureau. The Lady Mayoress of Manchester, Mrs. J. Toole, President of the Women's Gas Council Branch, was present, and performed the opening ceremony. On her arrival Mr. McKendrick, Assistant Commissioner of the Empire Tea Market Expansion Bureau, presented her with a casket of tea.

Mr. McKendrick, in his speech of welcome, thanked the Lady Mayoress, on behalf of the tea growers of India and Ceylon, for her interest and encouragement in their work, and also on behalf of the Manchester Branch of the Women's Gas Council for her presence there that afternoon.

The Lady Mayoress expressed her sincere good wishes for the growth and development of the Manchester Branch of the Women's Gas Council, and in mentioning the films that were to be shown, said she was conscious of a very close link between tea and gas. In conclusion, the Lady Mayoress said that the Lord Mayor, who had been connected with the Gas Department for a great many years, asked her to convey his very good wishes to members of the Women's Gas Council.

In proposing a vote of thanks to the Lady Mayoress, Miss Robinson (Secretary of the Manchester Branch) said how very much they appreciated her presence there that afternoon, and also she would like to take the opportunity of thanking the Lady Mayoress, on behalf of the Women's Gas Council, for so graciously accepting the office of President.

Following the showing of the films the members adjourned to the Regal Café, where they were entertained at tea.

The Coal Subsidy Denounced

Councillor Walter Muter's Strong Words

Members of the Public Utilities Committee of the Edinburgh Town Council visited the Granton Gas-Works, Edinburgh, on Jan. 29. For the year ended May, 1936, the Department attained the record production of 3,936 million cu.ft. of gas, a 6% increase as compared with the previous year. The party were conducted on their tour of inspection by Mr. J. Jamieson, Engineer and Manager.

Since the Committee last inspected the works considerable additions have been made to the plant, in order to cope with the growing output and add to the efficiency of the works. Experiments are being carried out in active collaboration with the Fuel Research Station of the Department of Scientific and Industrial Research, and while the interests of the Edinburgh Gas Department have been kept in mind, the work is of importance to the Scottish coalfields, and is of considerable interest from a national standpoint. Prominent among the plant additions have been electro-detarrers for the removal of tar fog; benzole recovery plant; installation of additional purifiers; and further extension to the vertical retorts, together with coke storage and screening plant for local sales.

At a luncheon following the inspection a welcome was extended to the guests by Councillor DUNCAN, Convener of the Gas Committee.

Councillor W. MUTER, Chairman of the Edinburgh Public Utilities Committee, said they would be in a better position industrially to-day if all other industries devoted to their business the same degree of thought and careful consideration, based on scientific data, as the Gas Industry.

Dealing with the coal position, Councillor Muter said that the Joint Consultative Committee of the coal industry had conferred recently with the Minister of Mines and a suggestion, very interesting and specious, had been made that the export

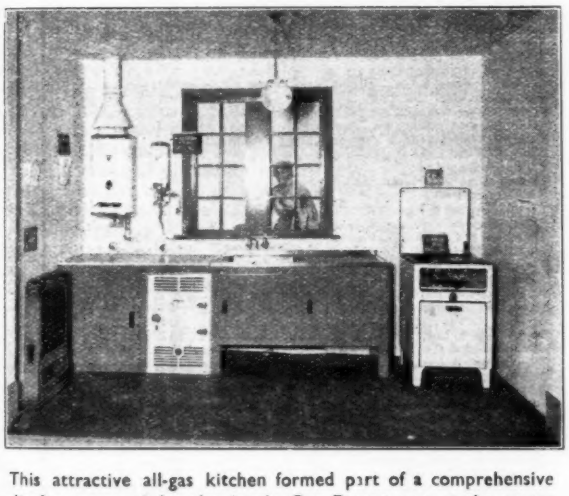
coal trade should be subsidized by the Government. At the moment the export coal industry was being subsidized by public utility undertakings and large scale commercial operations. Public utility undertakings could not afford and would not permit an artificial price to be maintained in their basic materials. They might be sympathetic, but their main concern was to run their business on economic lines and give the best service. Councillor Muter expressed the hope that the Government would soon make some pronouncement on the oil position in relation to the Gas Industry. Possibly they might see in five to ten years in the neighbourhood of the Gas-Works a great oil extraction plant, worthy not only of Edinburgh but of Scotland as a whole.

Mr. GEORGE MILLS, Divisional General Manager for Scotland of the L.N.E. Railway Company, replied on behalf of the guests.

Mr. E. SEDDON, Electrical Engineer and Manager, Edinburgh Corporation, said he felt that the coal trade was not dealing fairly as between its respective clients. The coalmasters were not putting their cards on the table. Small traders could buy coal more cheaply than large consumers such as public utility undertakings.

Mr. J. JAMIESON remarked that smoke abatement had been advocated for many years in this country. Their first experiments in the production of smokeless fuel were sufficiently successful to indicate that an important announcement on the subject would probably be made in six months' time. It was stated by experts that damage to the annual extent of £80,000,000 was caused by smoke, which was equivalent to £2 for every ton of coal used for domestic purposes. An address had been delivered recently in Edinburgh by a representative of the Coal Utilization Council. The coal industry was conducting a back-to-coal campaign, but he thought it was wrong in principle to consume raw material in an inefficient manner, apart from the loss caused by smoke. Carbonization was the means of extracting 3,000 by-products from coal. The experiments conducted by the Gas Department were helping to create a market for the product of the coal industry, and it was unfair that the Department should bear all the cost.

All-Gas Kitchen at Leeds Exhibition



This attractive all-gas kitchen formed part of a comprehensive display arranged by the Leeds Gas Department at the recent *Yorkshire Post* Building Trades Exhibition held in Leeds. Good business was done by the Gas Department as a result of their exhibit.

Manchester District Association of Gas Engineers

Visit to Paint Works

Members of the Manchester District Association of Gas Engineers paid a visit to the Walpamur Company's Paint Works at Darwen on Friday, Feb. 5, under the leadership of their President, Mr. A. L. Holton, Chief Engineer to the Manchester Corporation Gas Department.

The factory of the Walpamur Company is generally considered by those who visit it to be a very fine example of a progressive and modern paint works. Few people have any conception of the detailed work behind the production of the large demand for paint, or of the organization required to be observed in every component part of manufacturing, the lay-out of the various departments, and the necessary degree of cleanliness.

The members of the Association were welcomed to the Works by Mr. A. C. Blair, Industrial Manager, in the unavoidable absence of Major Mellor, the Managing Director.

A Paper entitled "Corrosion and Paint" was read by Mr. V. G. Jolly, Ph.D., F.I.C., Chief Chemist to the Company, which will be referred to in a subsequent issue.

By kind invitation of the Walpamur Company the members of the Association were entertained at luncheon.

Mr. A. L. HOLTON, in proposing a vote of thanks to the Directors of the Company for their hospitality, remarked that one of the gas-works in the management of which he was associated was situated in the chemical district of Manchester where the Post Office experienced great trouble in connection with the preservation of their telegraph wires. A detrimental effect was also noticeable in regard to the iron and steel structure of the gas-works. They all knew something of the effect of acid and alkaline fumes as well as the general acidity of a town atmosphere. He had long been an advocate of the adequate use of protective painting, but he now realized more than he had ever done before how necessary it was to use a thoroughly good article. The application of paint was a matter which deserved the very closest study.

The LORD MAYOR OF MANCHESTER (Alderman J. Toole), a member of the Manchester Corporation Gas Committee, seconded the vote of thanks, and emphasized the importance of gas engineers paying visits to industrial concerns.

The vote of thanks was carried by acclamation.

Mr. A. C. BLAIR having responded to the vote, the members then visited the works and inspected the various processes.

Salford Against Selling

Relief of Rates Considered

By 25 votes to 15, Salford City Council has rejected a proposal to consider the possibilities of selling the City's Gas Undertaking.

Councillor Crookell put forward a motion that the plan be considered with a view to enabling the Corporation to discharge all obligations relating to the Works and to provide a fund which would ensure an income equal to the amount now paid by the Gas Department towards the relief of rates. During the discussion it was revealed by Councillor Milwood that since the Gas Undertaking was owned by the Corporation it had paid over £900,000 towards the relief of rates. Councillor Milwood, opposing the resolution, said that the capital locked up in the Undertaking was far from valueless. He warned the Council against allowing the control of the Department to pass into the hands of private enterprise which would exploit it for dividends.

Glasgow and Coke Oven Gas

Contract Expiring

At a meeting of Glasgow Town Council on Feb. 4 it was intimated by the Town Clerk that the ten-years' contract between the Glasgow Corporation and Messrs. James Nimmo & Co., under which the latter has supplied the Corporation with 2 million cu.ft. of gas daily from the coke oven at Auchingeoch Colliery, expires on Feb. 28.

It was also stated that some temporary arrangement would be necessary pending a decision regarding renewal of the contract. It was agreed to ask the Gas Committee to reconsider proposals from Messrs. Nimmo regarding the renewal of the contract and also proposals from Messrs. William Dixon, Ltd., Govan Ironworks, Glasgow, who offer a daily supply of 5 million cu.ft. of coke oven gas. The Gas Committee is to meet within two weeks to consider the matter.

The price paid to Messrs. Nimmo has been 11d. per 1,000 cu.ft. and the new price suggested is 6d. Messrs. Dixon have been producing coke oven gas since April, 1936, and it is estimated that £200 worth is burned to waste daily.

Gas Up Electricity's Sleeve

Supply Company Loans Gas Ring

A correspondent, who is a gas engineer, tells us of a humorous case reported to him by a Lady Cookery Demonstrator. On visiting a certain customer's house she was informed that the housewife had recently had trouble with her electric cooker. The local supply company examined the cooker and removed the hotplate, which they forwarded to the makers' works; the makers then asked for the oven to be forwarded to them, which was accordingly done.

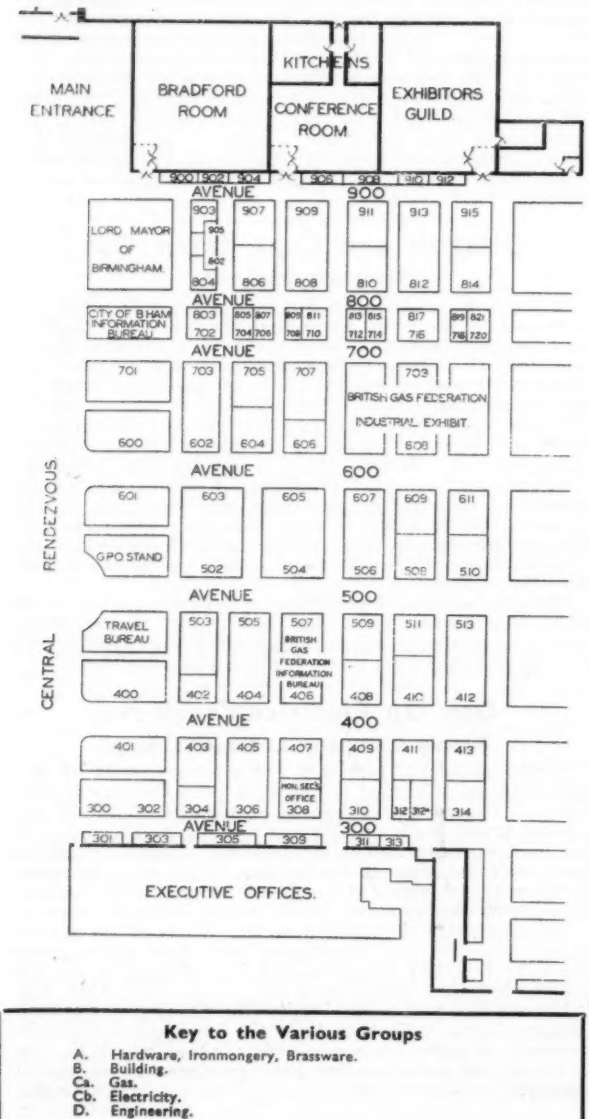
The housewife then called at the offices of the electric supply company and complained that they had removed the only facilities she possessed for cooking meals, and asked what they could do to assist her. The reply was: "We can lend you a gas ring." The gas ring was so satisfactory that a little time later the local gas undertaking received an order for a gas cooker, about which the customer is enthusiastic after her experience of an electric cooker.

THE GAS INDUSTRY SECTION AT CASTLE BROMWICH

THE Gas Industry Section once again constitutes a prominent feature of the Engineering and Hardware Section of the British Industries Fair at Castle Bromwich, being supported by most of the leading manufacturers of gas plant and appliances. It also includes the Joint Industrial Exhibit arranged by the British Gas Federation, comprising a representative display of industrial equipment, most of which is in actual operation, together with the Central Information Bureau.

There is this year an increased number of exhibitors, and in the "JOURNAL" next week we shall follow our customary practice of giving an illustrated description of many interesting exhibits, which include a number of new appliances introduced to the Industry for the first time.

PLAN OF GAS INDUSTRY SECTION



Key to the Various Groups

A. Hardware, Ironmongery, Brassware.
B. Building.
Ca. Gas.
Cb. Electricity.
D. Engineering.

LIST OF EXHIBITORS

whose displays contain much of interest

Exhibitor.	Stand No.	Ca.
Alder & Mackay, Ltd.	403	
Ascot Gas Water Heaters, Ltd.	404, 505	
Averill, C. R., Ltd.	309	
B.C.G.A. & B.G.F. (Information Bureau)	406, 507, 608, 709	
Braddock, J. & J.	411	
Bratt Colbran, Ltd.	806	
Bray, Geo., & Co., Ltd.	509	
Brockhouse Heater Co., Ltd.	808, 909	
Cannon Iron Foundries, Ltd.	601	
Cellactite & British Uralite, Ltd.	720, 821	
Clarkhills, Ltd.	305	
Clayton, Son, & Co., Ltd.	503	
Clough (Croydon), Ltd.	904	
Cowan, W. & B.	703	
Dempster, R. & J., Ltd.	503	
Dempster, Robert, & Sons, Ltd.	503	
Economic Gas Boiler Co., Ltd.	814	
Electrolux, Ltd.	606	
Evered & Co., Ltd.	810	
Flavel, Sidney, & Co., Ltd.	506, 607	
Forth & Clyde & Sunnyside Iron Companies, Ltd.	510	
"GAS JOURNAL," The	804	
Gas Meter Co., Ltd.	702, 803	
General Gas Appliances, Ltd.	701	
Gibbons Bros., Ltd., & Gibbons (Dudley), Ltd.	611	
Glover, Geo., & Co., Ltd.	609	
Glover, Thomas, & Co., Ltd.	504, 605	
Horstmann Gear Co., Ltd.	508	
Hurry Water Heater Co.	407	
Hyde, Silas	907	
Lighting Trades, Ltd., & Welsbach Light Co., Ltd.	604	
Main, R. & A., Ltd.	504, 605	
Maxol Heaters, Ltd.	413	
Metropolitan Gas Meters, Ltd.	402	
New Geysers (1931), Ltd.	310	
Orme, George, & Co.	314	
Oxley Engineering Co.	915	
Parkinson & Cowan (Gas Meters), Ltd.	602, 703	
Parkinson Stove Co., Ltd.	600	
Parkinson, W., & Co.	602	
Radiation, Ltd.	502, 603	
Robinson, J. H., & Co. (Liverpool), Ltd.	812, 913	
Russell, R., & Sons, Ltd.	409	
Sawer & Purves	511	
Smith Meters, Ltd.	812, 913	
Stott, James, & Co. (Engineers), Ltd.	911	
Stourbridge Refractories Co., Ltd.	714, 815	
Stoves, Ltd.	707	
Sutherland, A. G., Ltd.	408	
Sutherland Meter Co., Ltd.	812, 913	
Thomas & Bishop, Ltd.	312	
Thorp, Thomas, & Co., Ltd.	705	
Turners Asbestos Cement Co.	401	
Underpressure Engineering Co., Ltd.	906	
United Gas Industries, Ltd.	903	
Vulcan Stove Co., Ltd.	716, 817	
Waterless Gasholder Co., Ltd.	503	
Wellington Tube Works, Ltd.	400	
Westwood & Wrights, Ltd.	718, 819	
Wilkes, A. H., & Co.	710, 811	
Willey & Co., Ltd.	812, 913	
Wilson, Geo., Gas Meters, Ltd.	412, 513	
A.C.E. Machinery, Ltd.	B. 312	
Allan, Thos., & Sons	B. 810, 909	
Anglo-American Oil Co., Ltd.	D. 406	
Baldwins, Ltd.	Cb. 412	
Boydell, E., & Co., Ltd.	D. 219	
British Oxygen Co., Ltd.	D. 324, 410 511	
British Thermostat Co., Ltd.	Cb. 900	
British Thomson-Houston Co.	Cb. 504, 607	
British Vacuum Cleaner & Engineering Co., Ltd.	Cb. 309	
Carron Co.	B. 624, 725	
Chaseside Engineering Co.	D. 211	
Cochran & Co. (Annan), Ltd.	A. 311	
Crane, Ltd.	B. 308	
Dick, R. & J., Ltd.	D. 313	
Eagle Range & Grate Co.	B. 500, 601	
Falk, Stadelmann, & Co., Ltd.	A. 506	
Gittings & Hills, Ltd.	B. 721	
Glenboig Union Fireclay Co., Ltd.	D. 810, 913	
Hancock & Co. (Engineers), Ltd.	D. 218	
Harvey, G. A., & Co. (London), Ltd.	B. 622, 723	
Hurley Machine Co. (England), Ltd.	B. 814, 913	
I.C.I. Metals, Ltd.	D. 402, 503	
Ideal Boilers & Radiators, Ltd.	B. 318, 419	
Incandescent Heat Co., Ltd.	D. 226, 327	
Lench, T. W., Ltd.	D. 621	
Macpherson, Donald, & Co., Ltd.	B. 623	
Meltham Silica Firebrick Co., Ltd.	D. 810, 913	
National Benzole Co., Ltd.	D. 814	
Poles, Ltd.	Cb. 709	
Powel & Hill, Ltd.	B. 732, 821	
Rawlplug, Ltd.	Cb. 308	
Serck Radiators, Ltd.	D. 715	
Spencer-Bonecourt, Ltd.	D. 400, 501	
Staveley Coal & Iron Co.	B. 512, 613	
Stewarts & Lloyds, Ltd.	D. 500, 601	
Thompson, John (Wolverhampton), Ltd.	D. 806, 909	

SOCIETY OF CHEMICAL INDUSTRY DISCUSSION

The Gas Industry AND THE Domestic Consumer

At a Meeting of the Glasgow Section of the Society of Chemical Industry Dr. F. S. Sinnatt, C.B., M.B.E., Director of Fuel Research, read a Paper on this subject, and response to his arguments was made by Dr. E. W. Smith, C.B.E., Technical Director of the Woodall-Duckham Companies.

Dr. F. S. Sinnatt said: Only one generation has passed since the open coal fire provided, by methods which have been used from ancient times, the principal source of heat in the homes of this country. To-day new methods of heating are available and rapid changes are taking place. It is, however, difficult to assess the extent of these changes at all accurately.

For example, more coal is probably used in this country for domestic heating than for any other single purpose. Yet statistics of how much is used and in what ways are by no means detailed. It has been estimated that the consumption of household coal amounts to between 30 and 35 million tons a year. But these figures are no more than expert guesses, and, of course, embrace coal used for cooking and hot-water systems as well as for heating.

Besides the coal burnt in the raw state, about 17 million tons a year are carbonized at gas-works and 12 million tons used for the generation of electricity. Far fuller statistics of the consumption of gas and electricity are recorded. A further complication arises from the fact that the coke oven industry, besides supplying about 11% of the total gas sold, now provides coke for heating houses and buildings.

It is difficult to discuss the trends of domestic heating in quantitative terms, but it will, I think, be of some value to try to analyze them. Traditional methods of heating have been maintained with great persistency because of the esteem in which the open grate is held. The open fire has, indeed, many advantages in this climate, not the least of which is its ventilating effect on the rooms in which it burns. In the past, the fire had many functions. It was a valuable source of radiation to those workers who for six days a week in half the year saw the light of day only as the sun was rising or setting. It was used as a source of light, as a garbage-destructor, for drying and airing clothes, for heating water, and for cooking. This all-round service is of value and, where coal is inexpensive and suitable in properties and the towns are not too large, the coal fire, despite its shortcomings, will continue to be a most valuable source of artificial heat.

Economy and efficiency, however, play a somewhat secondary part in determining how our houses are warmed. For example, the preference of many people of this country for a home separated as far as possible from their neighbours makes any commercial form of central heating difficult. (Incidentally, this wide distribution of houses increases the cost of delivering heat in any form.) Mr. Donkin[1] and Mr. Shilstone and Mr. Monkhouse[2] have recently described a thermal-electric system in which the generation of electricity is combined with the distribution of heat in the form of hot water. They proved that if the heat could be sold at 2d. a therm, the cost of generating the electricity would be halved. This method has been tried successfully in Russia and, to a smaller extent, in America. Because of the differences in housing conditions, however, they considered that thermal-electric generation is precluded as a form of domestic heating in this country, and would be practicable only where the hot water could be used for industrial purposes.

A Matter of Taste.

Just as the tastes and habits of the people rule out some forms of heating, so they, rather than considerations of efficiency or economy, determine which kinds are adopted. The fact that gas, electricity, and central heating deliver a large proportion of their potential heat is only one reason why they are challenging the open fire; the great factor is their greater convenience. In comparison with the last generation, it may be said that houses are less the homes in which we live than the places in which we sleep and have our meals. The community are engaged in all kinds of new pursuits which take them from their homes. Among them are theatres, cinemas, evening classes, and clubs, all kinds of sport, motoring, and desire for the open country. Such interests occupy the leisure of every branch of the people, and of the whole family, so that the periods in which the home is used are often scarcely long enough to allow of an open fire being made, unless with free-burning fuel such as coalite. On the other hand, interests such as wireless keep the family at home and thus favour the open fire or central heating. It is interesting to speculate on the influence television will have, because it may require methods of heating which do not introduce light into the room.

Another fact which tells against the solid fuel fire is the difficulty of providing storage space. The age of large houses with servants is past, and the small labour-saving houses and flats of to-day frequently have inadequate space to store large quantities of solid fuels. Coal, coke, and smokeless fuels are and will have to be supplied in more convenient forms and under conditions which do not call for personal supervision of deliveries.

Despite the many influences which take people from their homes, there are, however, indications of a demand for more heat in the house. At first sight, this statement may seem to be contradicted by the statistics that are available.

This can be attributed to such factors as the improvement in housing conditions since the war, which has increased the number of houses with two living-rooms. The heating of one of them is frequently of an intermittent nature, and gas, electricity, or oil stoves are commonly used. Such first-hand experience of gas and electric fires is bringing home to the users their convenience and advantages, with the result that more fires are fitted in bedrooms, and radiators or panels in the halls and corridors. The increasing use of central-heating in offices leads those who work in them to demand temperatures of a similar uniformity in their houses, while such subtler changes as the thinner clothes that women wear to-day accentuate this demand.

Smoke Reduction.

It is, indeed, possible that the maintenance of the domestic market for coal in the raw state in certain circumstances will be less bound up with the retention of the open fire than with the development of inexpensive central-heating plants and scientifically designed heating and cooking appliances. Research to reduce the smoke from the open domestic fire is being done at the Fuel Research Station and is being financed by the Coal Utilisation Council. Already automatic stokers which deal with quite small quantities of coal and can be operated without the production of smoke are being installed in great numbers. They are automatic in the sense that the ash produced need only be removed at daily intervals, while the coal need only be recharged once in about every eight hours. A rough assessment indicates that the amount burned in such plants is of the order of 750,000 tons per annum, excluding plants for steam raising, and this development has taken place in some four years. Automatic stokers using cleaned coal form a formidable competitor to other forms of heating. The way to encourage the use of raw coal is to provide the means by which it can be burned efficiently and without the production of smoke, and automatic stokers of a size suitable for the ordinary householder may be developed.

Another factor which has an increasing influence on the methods of domestic heating is the call for smoke abatement, or, in its broader sense, for the reduction of air pollution. There is a tendency to assume that the evils associated with the production of smoke are determined by the actual carbonaceous matter emerging from the chimneys. Black smoke is an indication of inefficient combustion, but it must be recognized that a smokeless industrial chimney may be emitting fine grit, which is practically invisible. Smoke abatement *per se* is no longer an adequate method of meeting the requirements of modern large cities. The quantity of fine dust carried into the air in the flue gases tends to increase as the methods of burning coal become more intense. This quantity can be reduced by taking advantage of the coal industry's offer of washed and cleaned coal, of which some 92 million tons were produced last year. Methods of eliminating grit can be applied to

[1] Fuel Economist, XI., 112, 1935.
[2] J. Inst. Fuel, IX., 200, 1936.

installations; these are being adopted and will ultimately eliminate the nuisance. There now remain the acidic compounds formed during the burning of coal. These bodies are derived not only from the sulphur in the coal, but from the chlorine which is also present.

The products obtained by the carbonization industries, whether at high or low temperatures, are entirely smokeless. A proportion of the sulphur and chlorine present in the coal is, however, evolved from the coke when it is burned. Important steps are being taken by the electrical industry to eliminate the whole of the smoke, grit, and acid gases from the gases emitted from their plants. Three large installations recently erected are unique as being the first instances in which light, power and heat, produced by burning fuel, are offered to the community without polluting the atmosphere with smoke grit or acid gases. The cost of the cleaning plant and of the operation of the processes is, of course, a material addition to the cost of producing the electrical energy.

Influencing Factors.

It seems, therefore, that the factors which are influencing the supply of heat and light to the household may be summarized as follows:

(1) Changes are taking place in the way in which the community is living.
(2) The modern type of house and flat has a limited storage for solid fuels and this suggests a reduction in the amount of solid fuels used.
(3) Clothing worn by the community is much lighter than in the past. This applies particularly to women who, as a rule, spend a greater proportion of their time in the house.
(4) There is an increasing demand for greater comfort and warmth in houses generally and in particular an attempt to eliminate cold rooms from the house.
(5) Air pollution is being increasingly recognized as an objectionable feature in large communities.
(6) The low-temperature carbonization industry is developing.
(7) Three large electrical undertakings are equipped with plant to eliminate smoke, grit, and sulphur from the gases discharged into the air.
(8) Much gas is produced from coke ovens which should, in the national interest, be used as profitably as possible.

It would appear that the demand for gas, electricity, central heating, and smokeless solid fuel may well increase. All these provide heat without smoke, and, in the first two cases, the emission of acid gases may also be avoided. If this represents the change which is occurring, it is important to try to visualize how the increased demand for gas can be met. The grid system has made it possible to increase the supply of electrical energy with great ease. In the case of the production of gas, however, it is not unlikely that at some period the amount of solid fuel for domestic purposes will reach a stabilized amount. There may be a demand for a greater proportion of gas which can only be obtained by gasifying a greater proportion of the coke.

Present systems of carbonization have already been brought to a high state of efficiency, and so long as the demand for gas and coke continues in its present proportions, the methods now being used are satisfactory. It therefore seems that some system of treatment is required in which the coal is completely converted into gas, so that the whole of the sulphur may be eliminated. Such a system is found in complete gasification under pressure in oxygen. This process yields gas of high calorific value and it can be made so efficient by judicious control of the reaction conditions that as much as 90% of the total heat appears as potential heat in the gas. The quantity of oxygen required for gasification is relatively low, amounting to from 50 to 60 cu.ft. per therm of gas made.

The following table shows the general effect of increasing the pressure upon the products obtained by completely gasifying coal in oxygen:

Pressure	1 Atm.	10 Atm.	20 Atm.
Composition of crude gas (dry)—			
CO	49·0	25·8	20·2
H_2	37·0	30·4	25·8
CO_2	11·3	27·5	31·8
CH_4	2·7	16·3	22·2
Composition of CO_2-free gas (dry)—			
CO	55·2	35·6	29·7
H_2	41·7	42·0	37·8
CH_4	3·1	22·4	32·5
Calorific value, B.Th.U. per cu ft. at 30 in and 60° F..	341	473	540

A plant of this kind with an output of 700,000 cu.ft. of gas a day has already been constructed in Germany. It should, perhaps, be pointed out that, when gasifying under pressure, it is only the oxygen injected into the plant that has to be compressed. This process could also be applied to coke and thus could be combined with ordinary carbonization and the by-products could be recovered.

A second method of complete gasification is to convert coal directly into water-gas. Experiments at the Fuel Research Station have shown that this process can be worked with some success with certain kinds of coal.

One advantage of complete gasification processes is that coals deficient in caking power can be used in them. A displacement of the open fire by other forms of heating would liberate some coal which could not be treated by the ordinary methods of carbonization.

An important corollary of the gasification of coal under pressure is that the system of purification, distribution, and storage could be modified. The whole product of gasification could be rendered sulphur-free, and this could be achieved in much smaller space than is at present occupied by iron oxide boxes. The storage and distribution of gas could be carried out under high pressures. This suggests that the manufacture of a proportion of the gas in this country might be centralized, and a part of the system of distribution modified so as to deal with higher pressures. Such a system would naturally embrace the utilization of the gas from coke ovens, a portion of which at present is not utilized as economically as it might be.

Interest is being taken in processes for the conversion of mixtures of hydrogen and carbon monoxide into liquid hydrocarbons and the problem has been the subject of a great deal of research work, some of it on a large scale. Hydrocarbons suitable for use as motor spirit and diesel oil can be produced from gas mixtures, and it may be that at some stage in the development of the Gas Industry this process will form part of its technique.

DR. E. W. SMITH'S CONTRIBUTION.

When I was asked to open the discussion on Dr. Sinnatt's Paper, I had a very hazy idea of the method that was to be adopted for dealing with the subject, and I now find that to give really satisfactory answers to the very important questions that Dr. Sinnatt has raised would require much greater genius, knowledge, prevision, and understanding of the psychology and economic conditions of the masses of the people than are available to me.

It may have occurred to our good friend, Mr. Napier, Chairman of this Section of the Society of Chemical Industry, that the subject we are discussing this evening is not particularly suitable for a Section of the Society. On further consideration, I am sure he will agree—

(1) That the Gas Industry is one of the largest chemical industries in the country.
(2) That its technical development depends largely on the works of the chemists.
(3) That the Society has always taken a great interest in the development of the Gas Industry.
(4) That if the chemist is to be as useful as he might be, he must have the opportunity of "thinking imperially"—he must know the bearing of his work on the economics of the Industry and on the requirements of the community.

I am sure we shall be excused for discussing this subject on this occasion.

Dr. Sinnatt has put some awkward questions, but they needed to be put. In effect he says "I know the Gas Industry shoulders its responsibilities very seriously; it considers itself a public service, capable of supplying the domestic consumer with all his heat requirements. But what is your long-distance technical policy for gas production in view of the new techniques that are becoming available, and the rapidly changing conditions of living within the community?"

I hope I have interpreted him fairly and correctly. He has performed a most valuable service in raising these questions in the way he has, and for a long time to come we shall be getting replies to some or all of them.

For the time being, on my own behalf, it is my duty this evening, and in a tentative way, to reply to some of Dr. Sinnatt's queries. In dealing with this matter I do not wish to be misunderstood. I am a whole-hearted believer in all kinds of research—those of immediate bread and butter importance, and those having long-distance objectives. Let me then summarize Dr. Sinnatt's queries, and make my comments, for what they are worth.

He says—"What is going to happen when, with present methods of gas production, the amount of gas sold increases to such an extent that a market cannot be found for all the coke that is made?"

I—rightly or wrongly—have no fear of this. There is

only available for sale 8 million tons of coke per annum from the Gas Industry. A very small fraction of this is used in the open fire; slightly more is used for domestic central heating, and in closed domestic boilers, and the rest is used for other than purely domestic purposes. But 30 to 35 million tons of *coal* are said to be used for domestic heating. An attack can be successfully made on that market, as has been shown by a large number of progressive gas undertakings and coke ovens.

Some fear that when the present demand for coke oven coke in industry slackens the domestic market will be again flooded with coke oven coke. This will not be so serious as would at first appear. The iron and steel industry to-day is largely producing its own coke and utilizing its own gas. Should there be a slackening in that industry, it is highly improbable that the coke will be put on the market.

Enormous Flexibility.

Apart from this, the Gas Industry itself has enormous flexibility. Water gas is made in varying quantities, either in vertical retorts or in outside generators, the amount made varying with the price of coke. When there is a shortage of coke, less water gas is made.

My reply to Dr. Sinnatt's first question is that I believe that owing to the very great discrepancy between the cost of therms in the form of coke and gaseous therms—properly handled—the demand for coke may for a long time be greater than the demand for gas.

We must maintain perspective in this matter. Who is our consumer? I have been delving into facts and statistics in this connection, and find that in Great Britain there is a population of about 45½ million people. The present approximate natural increase is 180,000 per annum or about 0·4%. The total number of persons doing gainful work is about 22½ millions. Therefore about one-half of the population is earning money to keep themselves and the other half.

The number of houses in Great Britain is to-day about 11 millions. During the last five years the average number of new houses being built each year is estimated as being 250,000, an increase of less than 2½% per annum.

The following is a table of income gradings of 23½ million persons estimated in 1934 by the statistical staff of the London Press Exchange.* The total amount of the national income was taken as £4,000 millions. It was distributed as follows:

—	Numbers in Group.	% of Total Numbers.	Total Income of Group.
	Millions.		£ (Millions'.
Persons receiving—			
Below £ 150	15·90	67·6	1,450
£ 150–£ 250	4·10	17·5	750
£ 250–£ 500	2·70	11·5	820
£ 500–£1 000	0·54	2·3	325
£1,000–£2,000	0·17	0·7	200
Above £2,000	0·09	0·4	460
	23·50	100·0	£4,000

It will be seen that over 85% of the population were dependent on incomes of £5 a week and less, and about 97% on £10 a week and less that 55% of the national income goes to 85% of the people, and 75% to 97% of the people. The number of people earning £10 a week and more is only 3·4% of the total, but their share in the total national income is about 24% of the total. To me, the significance of these figures is that no Industry catering for a national service can increase, progress, or improve unless its primary objective is to cater for the masses, those earning less than £5 a week. The potential consumption is there, and slight increases there mean more than large increases from 3·4% of the population (those with £10 a week and more).

No Radical Change Foreseen.

I cannot see any great radical change taking place in the methods that will be used by the bulk of the population for domestic heating in the future. Solid fuel, coal and coke, will continue to be used because of lower costs, as the main source of heat for domestic requirements. There will be improvements in the equipment in which coal and coke are used. The fuels will be better prepared and selected. The newer houses are badly equipped in the main for storing solid fuel, but these houses are a very small proportion of the total.

Another factor of very great importance, having a bearing on this argument is the proportion of income that is spent on heating and lighting in the various grades.

There is not much information available, but what there is would indicate that this item amounts to about 7·0% of a low wage earner's income, and drops to about 2½% of the higher incomes. It is said that figures can be made to prove anything, but with care they can be helpful in giving a better understanding of the facts than we should have without them. The following is an approximation which is indicative of the way in which the total expenditure in Great Britain on heating and lighting is borne by people of different incomes:

37·5%	is spent by households with budgets under £ 150 a year
17·3 ,,	,, ,, ,, ,, ,, ,, ,, £ 150–£ 250 ,,
23·4 ,,	,, ,, ,, ,, ,, ,, ,, £ 250–£ 500 ,,
10·5 ,,	,, ,, ,, ,, ,, ,, ,, £ 500–£1,000 ,,
5·5 ,,	,, ,, ,, ,, ,, ,, ,, £1,000–£2,000 ,,
5·8 ,,	,, ,, ,, ,, ,, ,, ,, Over £2,000 ,,

Thus about 55% is spent by families to whom the matter of 1s. more or less per week in their fuel costs must be a matter of great concern, and a further 23% by families by whom a slightly larger amount will be spent under this heading only after careful reckoning.

Cost of heating and lighting is therefore of prime concern to the majority of our consumers. I am convinced that while gas consumption will increase for cooking, water heating, and intermittent heating, there will be an increasing use of coke for domestic purposes, and that in spite of the rapidly increasing industrial gas load, there is more likely to be a shortage of coke than of gas. The time may come when in order to maintain the coke output, surplus gas may be used for heating retorts.

The second main point raised by Dr. Sinnatt—by implication—is that it ought to be the aim of the Gas Industry to develop processes of gas manufacture which would convert any given coal completely into gas, leaving as a residue—as in the electrical industry—nothing but ash.

I would be completely in agreement with this school of thought if there were an *a priori* case that by such a policy a cheaper gas of the right characteristics would be made. But so far the evidence, such as it is, is the other way. The normal modern methods of gas manufacture produce the cheapest gas so far developed. The cost of gas depends on the demand for coke, and the price of coke will have to drop very considerably indeed before the cost of gas production is sufficiently affected to justify a radical change in existing methods. The only matter of outstanding importance in gas production is the *cost* of production of therms of gas having the right characteristics. Therms per ton, as such, are not of primary importance, and the anxiety to produce 250 to 300 therms to the ton is only important in so far as it enables the Industry to produce a cheaper therm of suitable gas.

Selling Price a Deciding Factor.

I look on the Industry as one engaged primarily in the production of gas. Our success may be measured by the proportion of the Nation's requirements, industrial and domestic, that are being met by the Industry. In the main, the selling price of gas is the deciding factor. Consequently it is vital that our main concern should be to get gas to the consumer at relatively lower and lower rates.

Of just as much importance are the markets for so-called secondary products—coke, tar, benzole, &c. Good receipts for these reduce the cost of gas production. It is conceivable that there are circumstances in which even therms per ton may have to be sacrificed if the overall value of secondary products can be enhanced to a greater extent than the value in loss of therms. The Gas Industry is a coal processing industry in which the aim is to convert it into products of the maximum financial value, cheap gas being the primary objective.

Dr. Sinnatt, with the rest of us, is fascinated by the developments that are taking place in connection with methods of complete gasification at low and high pressures, the synthesis of methane, the Fischer process for the production of hydrocarbons from CO and hydrogen, &c., and in contemplating the possibilities of such developments, it is extremely difficult to keep one's feet on the ground, or one's head out of the clouds, but if the sole criterion of success be a reduced cost of production of therms, we still have a long way to go. It will be unwise for the Industry to expect too much from the work that is proceeding, or build up hopes for revolutionary changes. The work is none the less of intriguing interest, and of great importance. This catalytic synthesis work and high-pressure technique is of fundamental importance, and its outcome may be in directions we have not yet suspected. It is sure to throw a great deal of light on the mechanism of existing technique, but we must not be surprised if, from the

* Published in "The Home Market," by G. Harrison and F. C. Mitchell; 1935.

point of view of town gas supply, it has a relationship analagous to that of hydrogenation to petrol production.

The Industry to-day is convinced of the necessity of research, and still more research, on existing processes, and in connection with fundamental work of more remote application, but a great disservice will be done to the cause of research if unthinking enthusiasts hold out hopes that may not be substantiated. I am enthusiastically in favour of our research work in the directions I have indicated being pursued, and it will have been well worth while.

It must be remembered that so far the great bulk of this work has been done in Germany, the home of hydrogenation, the Fischer process, non-poisonous gas, &c., a country that desires to be self-contained at any cost, and a country less fortunate than our own in its supplies of good quality coals. What might be worth while in Germany may not be quite so attractive here.

Complete Gasification at High Pressures.

We must find out for ourselves, under our own conditions, but in passing I would like to ask Dr. Sinnatt whether he can answer one question that has puzzled me when reading the accounts of this work. It is implied that from lignite, coke, or anthracite, a gas can be obtained by complete gasification at high pressures and methane synthesis similar in its characteristics to town gas, with an efficiency of gas production of up to 93% of the original coal. Is this correct, and does this efficiency include all the solid fuel required for raising the necessary steam, and producing the power that is requisite for the process, including compression and the isolation of oxygen from the air? If my rough calculations are correct, the process is no more efficient than normal water gas production, and such figures stated in the way they are, are misleading. The process is certainly not as thermally efficient as that of carbonization, as generally understood, on modern plants.

It will be remembered that in existing methods of carbonization about 10 cwt. of coke are *available for sale*. In the new proposals, so far as I have been able to interpret the results, the equivalent of 10 cwt. of coke would be disposed of as CO_2 in the high-pressure purification process, for which there would be no ready remunerative outlet.

This brings me to the last point I want to make.

Dr. Sinnatt has indicated how little information there is concerning the domestic requirements for heat and light in the different classes of homes within the community.

I should like to see a "Bureau of Economics" within the Industry. I do not think we can long afford to be without one. It should be under the wing of the British Gas Federation. From the beginning it would have to be staffed by two or three of the most competent experts in economics and statistics that are available in the country. It might cost £5,000 a year to run, but it would be worth it. It would study every phase of the Industry from an economic point of view. It would collaborate with government departments in carrying out surveys of domestic and industrial requirements for heat and light. It would study the real trend in connection with the coke/gas ratio. It would have to master the subject of selling prices of gas, &c. It would give perspective on the relationship between costs of production and selling prices. It would study distribution, the effect of changes in the tastes and habits of the consumers, and changing geographical locations.

One could continue indefinitely indicating the type of work such a Bureau would undertake. Without such an organization the Industry must be ill-informed and flounder. We are big enough to justify such a move.

The contracting side of the Industry should be as vitally interested and concerned in this matter as the production side. The Industry depends solely on its economic soundness. Research and engineering are the handmaidens of administration, and satisfactory administration of a complex industry such as ours cannot be efficiently carried on without sound and accurate knowledge and statistics concerning not only what is going on within the Industry, but relating to the trend of development within the community as a whole.

I have not attempted to answer many of the detailed points raised by Dr. Sinnatt in his stimulating Address. It would have taken too long. I have rather confined myself to broad issues, and taken part in what I hope is only the first of such discussions.

Midland Coke Research Committee

Report of Progress During 1936.

I.—Experimental Oven Tests on Improving the Quality of Coke.

(i) *Coking Nut and Run-of-Mine Coal.*—In the Midland area it has been customary in the past to coke only the slack or small coal passing, say, a ½ in. mesh. The increased demand for metallurgical coke in recent years has been the greatest in the Midland area where, in 1934 and 1935, the production of oven coke was greater than in the year 1929, when an earlier record production was achieved. In 1934 and 1935, the oven coke production in the Midlands was 30% greater than in 1933, but the coal production in the same area only increased by 6% in the same period. Since the production of coal is, in effect, controlled by the demand for all qualities, there has been a shortage of small coal of coking quality. In many cases deficiencies of coking slack have been made up by coking nut coal, but nut coal has been found to yield, in the Midland area, a coke inferior in quality to that yielded by slack from the same colliery. The reasons for this have been investigated.

By coking, after crushing to a uniform size the different commercial grades of coal from one colliery—namely, large, cubes, doubles, singles, beans, and slack (+ 6, 6-2, 2-1½, 1½-1¼, 1¼-⅞, ⅞-⅜, and − ⅜ in. size) from the Parkgate and Silkstone seams, it was found that the "beans" (⅞-⅜ in.) yielded the weakest coke, the quality of coke then improving with mean size of the nut coal coked, but even with large coal (+ 6 in.) the coke was still inferior to that made from slack. By determining the durain content of each size it was found that, for this series, the 1½ in. shatter indices of the cokes made from sizes larger than slack were directly proportional to the amount of durain, which was present to the greatest extent in large coal (42%) and the least in "beans" (16%). By all tests applied, the bright coal of all the commercial grades was identical in composition, the difference in durain content being the only one recognizable.

It was possible to account for the superior quality of coke made from slack by its durain content, but, in addition, slack contains fusain which appeared to account for the improved quality of coke.

Addition of hand-picked fusain to the small nut coals gave a coke equal in quality to that made from slack, while the coking of beans varying in durain content confirmed the influence of durain. In a series of tests in which coke dust up to 9% was added to a series of coals, consisting of beans of varying durain and fusain content and slack, it was found that the effect of coke dust addition was the same in all cases, a series of parallel curves being obtained. This has established the fact that, with a relatively high rank Yorkshire coal, the effect of the addition of durain, fusain, or coke dust is entirely different, separate, and additive. Deficiency of durain cannot be compensated by the addition of coke dust or fusain, while addition of fusain to a mixture containing the most coke dust which can be used without making the coke abradable effects a still further increase in impact hardness. The first 2% addition of fusain is the most effective, but durain up to about 40% is beneficial.

The amount of coke dust which can be added to a coal without impairment of its abradability is dependent on the coal used, but up to 7% coke dust could be added to the Parkgate and Silkstone coal before the ½ in. shatter index fell to 97·0. It was found that addition of durain (finely crushed, 90% through ¼ in.) and fusain both tended to increase the ½ in. shatter index, whereas coke dust addition tends to lower it.

The need for a better substitute for fusain than coke dust is apparent, and tests have been begun with this in mind.

(ii) *Difficulties of Oven Discharge through Excessive Plasticity of the Coal.*—An unusual experience of "stickers," or ovens difficult to discharge, in modern ovens with good walls could not be explained by incomplete carbonization, for prolonging the coking period was of no

use and the ovens had to be raked out by hand. The occurrence on several occasions enabled it to be associated with coking a high proportion of nut coal from one colliery, this coal being found to develop an abnormal plasticity in tests made in the Sheffield Laboratory coking test, plasticity being measured by the extent to which the plunger fell through the coal charge after attaining the maximum swelling. Laboratory tests showed that addition of durain and fusain reduced the excessive plasticity, and the sticking in the oven was presumably due to excessive "squatting" of the charge by reason of its abnormal plasticity.

Tests made on the constituent coals of the mixture coked suggested that nuts from the Thorncliffe Thin seam was responsible for the excessive plasticity, which can only be avoided commercially by suitable blending of the coals used.

(iii) *Production of Reactive Coke in Coke Ovens.*—Coal was cleaned to 2·0% ash content by flotation in a dense medium and coked with a mixture of hydrated lime (0·5 to 0·75%) to fix the ash and 0·5 to 1·0% of sodium carbonate to activate the coke. The blends were coked in an 18 in. experimental oven in 14 hr. to give complete carbonization; similar charges were undercarbonized by 1½, 3, and 4½ hr. These tests showed that undercarbonizing a low ash coal mixed with alkali produces reactive coke which compares favourably with coke made by low-temperature carbonization, for although a rather more intense ignition is required the fires last longer (having higher bulk density) and do not disintegrate or crumble.

Such activated coke may be lighted with a reasonable quantity of paper and sticks, burns up rapidly to give a bright fire, flames pleasantly in the grate, and may be used in sizes up to 3 in., whereas ordinary oven coke can rarely be used in sizes exceeding 2 in., and frequently the upper limit is 1½ in. The flexibility with regard to the size which may be used enables a small or a large fire to be used.

The effect of the combined use of lime and sodium carbonate is to reduce the critical air blast (C.A.B.) of the coke by about 0·015, undercarbonizing reducing the C.A.B. still further. Undercarbonizing by itself only makes a small reduction in the C.A.B., an index which has been found to be the most useful criterion of the reactivity of coke used in an open grate.

By reducing the flue temperatures slightly to give complete carbonization in 19 hr. instead of 14 hr., a smaller degree of undercarbonizing is required to reduce the C.A.B. to 0·032, the lowest value attained, but rather more breeze is produced by slow than by fast carbonization.

II.—The Sampling, Analysis, and Testing of Coke.

(i) *Mechanical Crushing of Coke Samples.*—An iron built single toggle jaw breaker has been found to be a cheap and effective machine for mechanically crushing oven coke. It is possible to crush 300 lb. of large coke to 1 in., and, after selecting 50 lb. by increments, to crush 50 lb. to ½ in. in a total crushing of 28 min. compared with 6 hr. required with hand crushing. This method enables B.S.I. methods of sampling to be adopted satisfactorily.

(ii) *Average Quality of Midland Cokes.*—Records of the mean quarterly moisture and ash contents and 1½ in. shatter index of 27 Midland cokes supplied to a Lincolnshire blast furnace plant have been made and show the difficulty of obtaining sufficient supplies of coking slack of standard quality with the present high demands. Although the average quality has fallen somewhat there has not been the excessive deterioration of quality such as has marked earlier periods of peak demand.

(iii) *Determination of the Real Specific Gravity of Coke.*—Tests have revealed various sources of error in the determination of the real specific gravity of coke, and have emphasized the importance of using air-free water and of brisk agitation of the powdered coke during boiling to free entrapped air. The use of a wetting agent such as Perminal may give positive errors due to adsorption on the surface of the coke. The Northern Coke Research Committee's method is recommended as being the most generally satisfactory.

III.—A Laboratory Study of the Carbonization of Coal.

(i) *Assessing the Value of Coking Coals.*—It has been found that the determination of the properties of the bright coal in a coking coal, with a record of the content of durain, and fusain is the most satisfactory method for relating the quality of coal and coke. The properties of the bright coal measured are the carbon and hydrogen contents, and the swelling power in the Sheffield Laboratory coking test. The amount of durain is determined with the use of the Sheffield Laboratory coking test. A better method for determining small percentages of fusain is, however, desirable, though since, after fine crushing, the fusain is concentrated on the sizes through 60 mesh, present methods of determination give an approximate value.

(ii) *Relationship between Swelling Power and Composition of Coal.*—An analysis of about 100 tests of swelling power in the Sheffield Laboratory coking test with determinations of the carbon and hydrogen contents of the coals has shown that, by expressing the analysis on the Parr unit coal basis (dry, mineral-matter free), a simple graphical relationship between swelling and composition can be traced. The swelling power of a coal has been found to be more influenced by the hydrogen content than was previously suspected. Only coals of carbon content between 82·5 and 91·0% (hydrogen over 4·5%) swell at a rate of heating of 1° C. per min., the swelling power increasing with carbon content unless the hydrogen content falls. The most strongly swelling coals are 87·5 to 89·5% carbon, and the higher the carbon content the lower is the hydrogen required to give a specific swelling power, but for all ranges of carbon a high hydrogen is important in influencing swelling power.

(iii) *Relationship between the Composition of Coal and its Volatile Matter.*—An analysis of the very complete carbonization tests made by the U.S. Bureau of Mines in the B.M.-A.G.A. test using 100 lb. of coal has shown that the composition of each constituent of the volatile matter may be related fairly simply to the composition of the coal. Formulæ have been derived which relate the yields at 900° of oxides of carbon, water, methane, ethane, ethylene, hydrogen, light oils, and tar to the composition of the coal, the oxygenated products being related to the oxygen content of the coal, the methane, ethane, ethylene, light oil, and tar to the hydrogen content of the coal, and the hydrogen in the gas to the carbon content of the coal. These formulæ emphasize the significance of the hydrogen content of coal in influencing the thermal yield of gas and the yields of light oil and tar on carbonization. Addition of the different formulæ enables an equation to be derived relating volatile matter to the carbon, hydrogen, and oxygen contents of a coal. Different formulæ have been derived for anthracites, lignites, and durain which yield volatile matter differing in composition from that of bright coal.

(iv) *Relationship between the Composition of Coal and Coke.*—A further analysis of the U.S. Bureau of Mines carbonization tests (which were made at temperatures between 500° and 1,100° in steps of 100° C.) reveals the fact that oxygen is retained in a coke until a very high temperature has been attained, coals of high oxygen content therefore yielding, at temperatures below 900° C., cokes of high oxygen content. Increasing temperature between 700° and 900° C. causes loss of oxygen as carbon monoxide and of hydrogen as gaseous hydrogen.

IV.—The Combustion of Coke.

(i) *Significance of External Surface and Porous Structure.*—An indirect method of studying the accessibility of the porous structure of coke has been used. Coke of ¼ in. ranges between 3 and ½ in. has been floated in liquids varying in density to determine the percentage floating at different gravities. It was found that for this range of size 85% of each size floats below 1·0 sp.gr., but a coke of mean density 0·85 contains material varying in density from 0·75 to 1·0. For coke below ½ in. in size the density of liquid required to float 85% rises rapidly until it approximates to the real specific gravity (over 1·8) on material under 60 mesh size. The rapid change in effective specific gravity for sizes below ½ in. shows that the greater surface exposed gives greater accessibility of fluids to the porous structure. It follows that, for coke over ½ in. in size, the porous structure is comparatively inaccessible to fluids, including air during combustion, but for small sizes of coke penetration of air for combustion can occur the more readily the smaller the size of the coke. A graph of the results enables the conclusion to be drawn that 1/7 in. is a critical size below which the porous structure is almost completely inaccessible to fluids. This is in accord with conclusions drawn from another method of study.

(ii) *Ignition of Coke in a Domestic Grate with Paper and Sticks.*—A tentative relationship between the amount of sticks required for lighting and the C.A.B. of a coke has been drawn, less intense ignition being required for coke of 1-1½ in. than for 1½-2 in. coke.

(iii) *Effect of Ash on the Behaviour of Coke in an Open Grate.*—Analysis of tests made on the same coal of high and low ash has shown that reduction of the ash to very low values reduces the time required for a bright fire to be attained when the C.A.B. is constant.

Gas Undertakings' Results

Cardiff.

The report of the Directors of the Cardiff Gas Light and Coke Company for the year ended Dec. 31, 1936, states that an interim dividend to June 30 last having been paid on the consolidated ordinary stock at the rate of 6% per annum, and on the preference stock at the rate of 4½% per annum, the Directors recommend payment of a final dividend for the year on these stocks at the same rates, less income-tax. The Directors refer to the fact that the Company completes in 1937 one hundred years of service to the consumers of Cardiff and district. The Cardiff Gas Act, 1837 (7 William IV., Cap. xix.), by which the Company was incorporated, received the Royal Assent on May 5, 1837. A revised scale of gas charges, forecast by the Directors last year, became necessary in order to meet increased costs of coal, wages, and general materials, and this came into operation from April 1, 1936.

Colonial Gas Association.

The Colonial Gas Association, Ltd., report increases of gas sold as follows: 3·5%, for what are classed as the Association's Works, and 3·9% for the Subsidiary Companies. The revenue from the sales of gas has been maintained during the year, the average price received being somewhat less than in 1935, this difference being due largely to special tariffs for gas used for particular purposes. The total revenue shows an increase of £8,875 over the revenue for 1935. In the revenue account the cost of coal and purifying materials has increased by £5,672, due chiefly to the extra cost of coal. Interim dividends were paid in April last, and the final dividend recommended will make 6% for the year on the ordinary shares after payment of the usual dividend of 8% for the year on the preference shares. After payment of the final dividends and the transfer of £3,500 to reserves, the balance to be carried forward will be increased to approximately £25,338. Since July 1, 1934, the debenture liability has been reduced from £439,500 to £412,000. The amount of unissued capital stands at present at 10,547 £1 ordinary shares and 53,856 £1 preference shares. The Directors feel that this is too small an amount of unissued capital to have available to meet the growing requirements of the undertaking. A resolution to increase the authorized capital by the creation of 50,100 additional 8% preference shares of £1 each and 100,000 additional ordinary shares of £1 each was passed. This does not, however, indicate that it is intended to issue further shares at an early date as the matter of additional finance has not yet been decided upon.

Commercial.

The report of the Directors of the Commercial Gas Company for the year ended Dec. 31, 1936, states that the Directors regret to report the illness of Dr. Charles Carpenter, which will involve his absence from the Chair at the General Meeting. They feel sure that the Proprietors will share their sympathy with Dr. Carpenter and his family in the unfortunate circumstances. For the year ended Dec. 31, 1936, the revenue account shows a profit for the year of £128,474, which, together with the balance of £6,767 brought forward from the previous year, makes a total of £135,241. After providing for the payment of the interim dividend of £2 10s.%, less income-tax, paid on the ordinary stock in August last, for debenture and other interest, there remains a balance of £48,905, out of which the Directors recommend the payment of a final dividend of £2 10s.%, less income-tax, making a total for the year of £5%. In conformity with the Acts of Parliament regulating the Company, the Directors have elected Dr. Edward Frankland Armstrong, F.R.S., to the seat on the Board vacant through the death of Mr. Frederick McLeod. The quantity of gas made during the year was 16,811,930 therms. Of this quantity 21,950 therms were sold for public lighting, and 15,389,540 therms were accounted for by private supplies per meter.

East Hull.

The revenue account of the East Hull Gas Company, after the transfer of £2,000 to the renewal fund, shows a profit for the year of £22,703. The profit, together with a balance of £1,745, brought forward from the previous year, makes a total of £24,449. After providing for fixed charges and dividends on the preference and ordinary stock for the half-year ended June 30, 1936, the profit and loss account shows a balance of £9,907. The Directors recommend that a dividend at the rate of 4½% per annum on the 4½% preference stock and at the rate of 5% per annum on the ordinary stock be paid for the half-year ended Dec. 31, 1936, which will absorb £7,325, leaving a balance of £2,582 to be carried to the next account. Capital expenditure on 4·54 miles of new mains amounted to £3,308; 1,765 additional gas appliances have been sold or hired; 349 additional meters have been fixed, making the total number of meters fixed 24,036; the number of public lamps supplied is 2,282. The quantity of gas sold during the year is 2,582,537 therms (573,897,300 cu.ft.), an increase of 0·61% as compared with the previous year. The block system of charging for gas and the special terms quoted for industrial users are encouraging the greater use of gas service.

Malton (United Kingdom).

The Directors' report for the half-year ended Dec. 31, 1936, on the workings of the Malton Gas Company states that the expenditure in the revenue account amounted to £8,359, and the receipts to £10,140. The profit is less compared with the corresponding period of 1935 by £125. This is more than accounted for by the increased charges for coal, which has cost the Company over £300 more. The gas sold again shows a satisfactory increase of 6,513½ therms, or 3·89%. The receipts from coke and tar are more but fittings less. The reason for the latter is that quite a number of Council houses were fitted up last year and none this. With the balance of £6,207 brought forward from the last accounts, there is a total amount available for dividend, after paying income-tax, of £7,733. The Directors recommend that a dividend of 6⅜%, free from deduction of income-tax, be paid for the half-year. This will absorb £1,530 and leave the sum of £6,203 to be carried forward to the next accounts.

Margate.

During the year the sales of gas by the Isle of Thanet Gas Light and Coke Company have increased 3·4%, and have reached 523 million cu.ft., or 2,407,209 therms. The demand for gas appliances and residuals has been well maintained. An interim dividend of 5% was paid on Sept. 29 last, and the Directors now recommend a final dividend at the same rate.

Narborough.

The working results of the Narborough, Blaby, Enderby, and Whetstone Gas-Light and Coke Company are reported to have been very satisfactory, an additional 149 new consumers having been connected and a large number of appliances placed on the district. The Special Order of the Company was approved in the autumn by both Houses of Parliament, and the Company is now working under the Gas Regulation Act. To comply with this Order, the balances of the reserve fund and contingency account have been transferred to the reserved fund authorized. The profit realized from the sale of investment relates to the Company's holding in Local Loan 3% stock, and which had been kept at the purchase price in the accounts. The original investment has been replaced at a slightly higher figure by the purchase of 2½% Consols. It is recommended that a final dividend be paid on the ordinary capital of the Company of 2s. 6d. per share, less tax, making, with the interim already paid, 7½% per annum, transfer the sum of £500 to the reserve fund, leaving to carry forward the sum of £3,181.

Pudsey.

The Directors of the Pudsey Gas Company submit report and accounts for the past year, which state that the sales of gas show an increase of 4·06% compared with the previous year. The balance of net profit, after deducting the interim dividend at the rate of 9% per annum, paid on Aug. 1 last, amounts to £15,631, from which the Directors recommend a dividend for the past half-year at the rate of 9% per annum.

Reading.

The Reading Gas Company's business continues to expand, the sales of gas during the year showing an increase of over 65 million cu.ft., or 4·6%. The revenue derived from residuals and the sale of gas apparatus continues to be satisfactory, and there has been an addition of 892 to the number of consumers. Dr. M. W. Coleman, who has been a Director of the Company for eighteen years, was elected Chairman of the Company in succession to Mr. J. C. Blandy, who relinquished this office in March last. The Directors are pleased to record that Mr. Blandy's services have been retained on the Board. Mr. A. H. Sherwood has been elected Deputy-Chairman. Interim dividends at the statutory rates for the six months ended June 30, 1936, were paid on Sept. 1, 1936, and the Directors now recommend that dividends at similar rates for the half-year ended Dec. 31, 1936, be paid, less income-tax. The Directors further recommend that a final dividend at the rate of 6½% per annum for the three months ending March 31, 1937, be paid, less income-tax, in respect of the £15,100 redeemable preference stock, which becomes due for redemption at that date.

Shanklin and Ventnor.

The report of the Directors of the Shanklin and Ventnor Gas Company for the year ended Dec. 31, 1936, states that the balance standing to the credit of the profit and loss account is £10,372, after payment of an interim dividend of 4%, less income-tax. The Directors recommend the declaration of a final dividend of 4% for the half-year, making 8% for the year, less income-tax. There has been an increase in the sale of gas over the year 1935 of 3,379,500 cu.ft. The amalgamation of the Shanklin and Ventnor Gas Company and the Sandown Gas and Coke Company, Ltd., has been approved by both Companies, and the Order giving effect thereto is now before the Board of

Trade for consideration; it is hoped that the amalgamation will take place at the end of the half-year.

Tottenham.

The report of the Directors of the Tottenham and District Gas Company states that after payment of dividends in respect of the half-year ended June 30, 1936, at the full statutory rates, and the dividends now recommended, all less income-tax, providing for interest, the accounts for the year show that the carry-forward has been increased by the sum of £364, and is now £54,543. The Directors recommend the payment of dividends in respect of the half-year ended Dec. 31 last at the full statutory rates of £6% , £5 10s.% , and £5% per annum respectively on the preference stocks and £6 15s.% per annum on the ordinary stock. The number of new consumers connected up during the year was 4,599, while the sales of gas show an increase of 5·28%. The Company, in common with other public utilities, agreed to a voluntary increase of 1s. per ton on coal to be effective as from Jan. 1, 1936, and advanced the wages of the employees by ½d. per hour as from July 1. The Company did not advance the price of gas to meet these extra burdens.

Wandsworth.

The report of the Directors of the Wandsworth and District Gas Company for the year 1936 shows a 5·3% increase in gas sold to consumers. The Directors report that the undertaking of the Leatherhead Gas and Lighting Company was amalgamated with that of the Company on April 1, 1936, under a Special Order of the Board of Trade and, in accordance with the provisions of the Order, the price of gas was reduced in the Leatherhead Limits of supply by $\frac{2}{3}$d. per therm as from Oct. 1, 1936. The undertaking of the Walton-on-Thames and Weybridge Gas Company was also amalgamated with the Company on Oct. 1, 1936. Mr. E. M. Wood was elected to the Board in accordance with the Special Order dated July 30, 1936. The number of consumers has increased by 6,753, and the number of stoves and other appliances by 33,114. During January the Company issued £500,000 of 4% preference stock at 104½%. After providing for debenture and other interest charges and payment for the half-year ended June 30, 1936, of a dividend of £2% for five months on the 4% preference stock, £2 10s.% on the 5% preference stock, £3 5s.% on the 6½% Leatherhead redeemable preference stock, and £3 10s.% on the consolidated stock, there remains a balance of £130,454, from which the Directors recommend payment of dividends at the same rates, less income-tax, making total dividends for the year of £4% per annum on the 4% preference stock, £5% on the 5% preference stock, £6 10s.% on the 6½% Leatherhead redeemable preference stock, and £7% on the consolidated stock, which permits the allocation of the sum of £26,963 to the employee co-partners.

Woking.

There is an increase of 5·8% in the amount of gas sold by the Woking District Gas Company for the year; the number of consumers has increased by 418. After providing for debenture and other interest charges and payment for the half-year ended June, 1936, of an interim dividend of £3,452, there remains a balance of £10,106, from which the Directors recommend that final dividends for the year be paid at the following rates (less income-tax): On the "A" ordinary stock £5 10s.% , making £11% for the year; on the "B" ordinary stock £3 17s.% , making £7 14s.% for the year; on the "C" preference stock £2 10s.% , making £5% for the year; and on the 4% preference stock £4% per annum for two months—leaving an amount of £6,429 to be carried forward to next account. An issue of £33,600 4% preference stock at £104% was made in October last, and in November £45,000 3½% redeemable debenture stock (1965) was issued at par.

Baffler Performance

We give below a number of written contributions to the discussion on the Paper by Mr. T. J. Legg and Mr. T. G. Noble before the London and Southern District Junior Association, published in the "JOURNAL" for Jan. 27 and Feb. 3, together with the Authors' replies.

IN RELATION TO THE SAFETY OF GAS APPLIANCES

Mr. W. J. Righton (Righton & Sons, Ltd.) wrote: In the first illustration, which described the parts of the geyser baffler, I noticed that a flat baffle plate was used. In the G.L.C. bafflers which we are at present using a curved baffle plate is used, and in some cases I believe a conical baffle plate is used. Are you of the opinion that the flat baffle plate is preferable to either of the other two? Do you think that the flat baffle plate will be subject to greater heat resistance and possibly delay the action of exhaust gases? On the other hand, it is quite possible that when downblow occurs it is more easily and efficiently deflected.

Authors' Reply.

We have no wish at this stage of our knowledge to be dogmatic as to the best shape of baffle plate. In the original G.L.C. baffler a curved baffle plate or cup was used, but when the design was improved a conical cup of reduced resistance was adopted. Other things being equal a flat plate has greater resistance to the upward flow of products than a curved or conical deflector, but it is quite possible to design a baffler of low primary resistance having a flat plate, provided the other dimensions of the baffler are correct. The advantage of a flat plate appears to be that under strong downblow it induces less suction than curved or conical plates. The work which we mentioned was still in progress will, we hope, enable us later to give a more definite reply to questions such as this.

Balanced Flues.

Mr. L. Athill (Parkinson Stove Company, Ltd.) wrote: Since mention was made several times of "balanced flues," it might interest you to know that some ten years ago I carried out quite a number of these installations on multipoint water heaters. Although some were satisfactory, where they were situated on the outside wall between two houses about 8 ft. apart—and therefore protected from direct heavy winds—they were not a success in more exposed positions. Furthermore, during frosty weather, and in houses where consumers were mean enough to turn out the pilot light at night, several cases of burst coils, due to frost, were experienced. While I have never been able to try it, I should say that this system, fitted with a Ventile on the inlet as well as the outlet, would probably be quite satisfactory.

Authors' Reply.

Our general views on balanced flue appliances are expressed in the Paper. They remain a very interesting possibility if the difficulties referred to therein can be overcome. We do not, however, agree with Mr. Athill that the simple expedient of fitting a Ventile on inlet and outlet would in itself achieve the desired object.

Criticisms of the Paper.

Mr. A. Forshaw (Chief Chemist, R. & A. Main, Ltd.) wrote: In Section III. it is stated "it is not permissible to assume that a baffler of zero resistance on one appliance will have no resistance when fitted to another." I quote this sentence as typical of the argument running through a great part of the ensuing pages. It is followed by the corollary that each appliance should be associated with a specific baffler. If I may say so, I think the Authors in a desire to reach what I myself consider a laudable conclusion—viz., that each appliance should be associated with a specific baffler—have rather "jumped" the evidence. They tell us that the resistance of a baffler is a function of the velocity, density, and viscosity of the gases passing through it. Now let us assume that a baffler must be designed to pass the products of combustion from a geyser and that the maximum gas rate is stated. Surely such a baffler can be designed to pass such products under their most troublesome conditions of velocity, density, and viscosity and to have a zero resistance! Are we then to understand that with some other appliance of the same or not greater rating, where conditions of velocity, density, and viscosity are less troublesome, the baffler will have more than a zero resistance? If the Authors reply Yes, then it seems to me that the greater in this instance does not include the less! I imagine however their reply may be, for instance, that the second appliance may come so close to the baffler that a downdraught may build up an area of pressure close to the outlet and so create some primary resistance.

I would point out that in that case it is the appliance which is at fault and not the baffler, or alternatively I would ask, Can a baffler with zero resistance then be designed for the second appliance? If so, will it not continue to have a zero resistance if transferred to the first appliance? Surely by proceeding on these lines we must approach the perfect baffler and such general purpose baffler must be capable of construction.

I should like gently to deprecate the introduction of the expression in the Paper where at least four constants are included, of which the most important is "suspected" to be something and the others are "probably" something else and in general our Authors confess "nor have we been able so far to

understand the significance of all the constants." At any rate, the Authors have the decency to put this part of their conjectures in very small print!

Speaking from the manufacturer's point of view, I must express the opinion that vitreous enamelled steel is the most promising material as yet put forward for bafflers. It is true it is slightly more expensive than some other materials, but its strength, lightness, and resistance to corrosion are quite notable. I have seen aluminium bafflers, for instance, which collapsed under torsional stress such as mentioned in the Paper. There are always people who are willing to provide something cheaper which they call "just as good," but it is as well to remember that failures due to foolish actions by one react unfavourably on the whole industry and to think very seriously before deciding everything mainly on a price basis.

Authors' Reply.

Replying to Mr. Forshaw, we emphatically disclaim the suggestion that we have "jumped the evidence," and are sorry that Mr. Forshaw should accuse us of so unscientific a procedure. In the Paper we give a few only of many tests on bafflers fitted to various appliances. These tests were not made in a desire to reach any pre-determined "laudable conclusion" but to ascertain facts, on which facts our conclusions are based. Mr. Forshaw appears to have misunderstood our use of the term zero resistance and indeed to some extent to have overlooked the main argument. In the course of this, reference is made to experimental facts, all pointing to the same conclusion, which can be checked by anyone. Mr. Forshaw restricts his argument that the perfect general purposes baffler is attainable, to one property only—the primary resistance. Even there we do not agree with him, but the argument is an academic one and we aimed at an essentially practical Paper, indicating in the text that we realized that in our reference to "primary and secondary resistance" we used the terms rather loosely.

We have not been able to produce the perfect "general purpose baffler," and until someone produces adequate experimental evidence concerning it we shall, for the reasons indicated in the Paper, continue to disbelieve in the possibility of its existence. If we may say so, with due respect, it appears that it is Mr. Forshaw's wish that such a baffler should exist that makes him accuse us of ignoring our own evidence. We are, however, grateful to him for his constructive criticism and for his lenient attitude towards our tentative equation!

A REVIEW OF THE CLAUSES OF

The Factories Bill

As Affecting the Gas Industry

The object of this Bill is to consolidate and modernize Factory Legislation which is at present based upon the Factory and Workshop Act, 1901, and various amending statutes. Several clauses in the new Bill affect the Gas Industry.

The legislation of 1901 contains various distinctions between factories and workshops. Briefly, factories were premises in which mechanical power is used, while the term workshop is confined to places in which industrial processes are carried on by hand. Since 1901 there have been few industrial processes which do not involve the use of mechanical power, and it is proposed in the new Bill to abolish the distinction.

Part i. of the Bill contains general provisions as to public health and deals with such matters as cleanliness, overcrowding, temperature, ventilation, lighting, drainage, and the provision of sanitary conveniences.

With regard to overcrowding, the Bill provides that a factory shall be deemed to be overcrowded if the number of persons employed at a time in any workroom is such that the amount of cubic space allowed for every person in the room is less than 400 cu.ft. The proposal made in 1926 that the Secretary of State should be empowered to increase this space in cases where lighting other than electric lighting is used has been dropped. The Bill requires that a reasonable temperature shall be maintained in every workroom; this provision will, no doubt, afford a useful weapon to gas salesmen anxious to demonstrate the economy and efficiency of gas as a lighting and heating medium.

With regard to lighting, the Bill provides that nothing in the requirements relating to the lighting of factories shall be construed as enabling directions to be prescribed or otherwise given as to whether any artificial lighting is to be produced by electricity, gas, or any other particular means.

It is to be noted that the sections are not to be rigidly applied to cases to which they are obviously unsuitable; it is open to the Home Secretary by regulation to modify the various requirements of the Bill so as to render them suitable to particular cases.

Part ii. of the Bill relates to safety and deals with such matters as prime movers, transmission machinery, unfenced machinery, hoists and lifts, and dangerous fumes.

From the point of view of the Gas Industry, the most important section of this part of the Bill is that which relates to the inspection of water-sealed gasholders—*i.e.*, a water-sealed gasholder which has a storage capacity of not less than 5,000 cu.ft. The main requirements of the Bill are as follows:

(1) Every gasholder to be of sound construction and properly maintained.
(2) Inspection by a competent person at least once in every two years.
(3) In the case of a gasholder of which any lift has been in use for more than 20 years, the internal state of the sheeting shall, within 2 years of the passing of the Act, and thereafter at least once in every ten years, be examined by a competent person by cutting samples from the crown and sides of the holder, or by other sufficient means. The samples so cut and a report of the examination signed by the person making it are to be kept available for inspection.
(4) A record showing the date of the construction of the oldest lift of every gasholder shall be kept available for inspection.
(5) The repair or demolition of every gasholder is to be supervised by a competent and experienced person.

The other provisions of interest in this part of the Act are:

(1) That which requires that every steam boiler unless externally fired or of the water-tube type shall be provided with a suitable fusible plug or an efficient low-water alarm device.
(2) That which requires certain precautions to be taken by persons entering any chamber where dangerous fumes are liable to accumulate.

Part iii. of the Bill relates to general welfare and contains provisions regarding washing facilities, first-aid, and welfare regulations.

Part iv. of the Bill contains special provisions with regard to health, safety, and welfare. Several requirements in this part of the Bill are new. The proposals with regard to the removal of dust are stronger than those of the existing law, and a prohibition is placed upon the lifting of excessive weights by women and children.

With regard to laundries, it is provided that all stoves for heating irons shall be so separated from any ironing room or ironing table as to protect the workers from heat, and that no gas iron shall emit any noxious fumes.

Part v. of the Bill deals with the notification and investigation of accidents and industrial disease, and does not materially alter the existing law on the subject.

Part vi. relates to the hours of the employment of women and young persons. Although important changes in the law are effected by this part of the Bill, these changes will only affect industries in which women and young persons are extensively employed.

Part vii. relates to certain specified processes. The part applies, to some extent, to building operations, and for the first time applies certain provisions of the Act to work of engineering construction. So far as the Gas Industry is concerned the term "work of engineering construction" appears to be limited to the work of demolition of a gasholder.

The rest of the Bill does not contain provisions which would appear to affect the Industry. So far as the requirements of the Bill are to be applied by the Home Secretary the procedure will be by Regulations.

It is satisfactory to note that before any Regulation can be made by the Home Secretary, full opportunity must be given for the making of objections by those interested. In suitable cases a local enquiry can be ordered.

THE ANNUAL MEETING OF

The South Metropolitan Gas Company

The Ordinary General Meeting of the Proprietors of the South Metropolitan Gas Company was held at Southern House, Cannon Street, E.C. 4, on Wednesday, Feb. 3—under the Chairmanship of Mr. FRANK H. JONES, M.Inst.C.E., the Vice-President.

The SECRETARY (Mr. F. G. Brewer) read the advertisement convening the meeting, and the minutes of the last Ordinary General Meeting and Extraordinary General Meeting, after which the seal of the Company was affixed to the Register of Proprietors.

VICE-PRESIDENT'S ADDRESS.

The VICE-PRESIDENT, on rising to address the meeting, said: Ladies and Gentlemen,—I regret that you will notice vacant seats at the Board. Two of the Senior Directors are not here; I shall refer in a moment to Dr. Charles Carpenter, our President. Mr. Frank Bush, as many of you know, has not been very well of late. He is one of the most valuable members of the Board, and I urged him not to come out in this inclement weather. Mr. Arthur Paddon, also, is not very well. I will ask you to take as read the Report and Accounts, which have been in your hands about a week. [Agreed.]

It is, I know, a matter of great regret to all of you here, as it is to his colleagues on the Board, that for the first time in 29 years the President is unable to address you. As you are all aware, he was taken critically ill in October, and, although he has made steady progress since then, there was no question of his being able to attend here to-day. It is unnecessary to remind you that Dr. Carpenter is a man who is satisfied with nothing short of the highest and the best, and in furthering the interests of the Company to which he has devoted his life he has spared himself least of all. No man has worked harder for this Company. But he made too heavy a demand upon his physical strength, and the strain of events brought about his illness. It will be your wish, I am sure, that I should send him a message of sympathy and of good wishes for the return of his former health. ["Hear, hear."]

The nature of Dr. Carpenter's illness was such that we could not look for his early return, and in these circumstances your Board have entrusted me with the Acting Chairmanship. I may say that it is a source of great strength to me that I have the help, as Acting Deputy-Chairman, of my old friend and colleague, Mr. Arthur Paddon. His experience and shrewd judgment are highly esteemed by Dr. Carpenter, as they are by me. I have also the knowledge that the day-to-day management of this great Company is in the hands of officers, most of whom have been trained by the President himself and have been imbued with his ideals and standards of efficiency. I am bound very largely to rely upon them, and I do so with the greatest confidence. For my part, I pledge myself to place at the Company's disposal my own training and experience, which is not inconsiderable, in the control of gas undertakings.

A PROCESS OF ADJUSTMENT.

Your Company, like most other undertakings in the country, is having to adjust itself to new conditions, and the process of adjustment is of necessity not free from difficulties. Your attention has been drawn before to the great changes in social habits which have taken place in recent years, and which are still in progress. It is an age of transition, and its effects are perhaps most apparent in areas like ours, which are already thickly populated throughout their length and breadth, and in which there is little virgin land to help new development. This is an aspect of the Company's business to which your Directors are devoting their closest attention, and they are adapting their sales and distribution policy accordingly. In particular, they are mindful of the great opportunity presented by the extensive re-housing schemes now on foot in many parts of the Company's area—an opportunity to prove once more that gas, provided it is given the freedom that it can reasonably and rightly claim, offers the most efficient, the most healthful, and the most economical fuel service available to any household, large or small. It would not, therefore, be inappropriate at this stage for me to say—and I say it very deliberately—that I possess implicit confidence in the future of our Company. Your Directors would have wished to recommend the payment of a dividend at least equal to that of last year, and this justifiably could have been done by appropriating money from the Reserve Fund. The Board have, however, considered it to be a wiser action to leave that Fund undisturbed, and to recommend the payment of a dividend of 5½ per cent., and I hope you will readily concur in this recommendation, which, of course, carries a bonus to the employees.

TARIFF SYSTEM OF CHARGES.

The outstanding event of the year, and the one which is perhaps uppermost in your minds, is the institution of the tariff system of charges for gas. I must, however, refrain from discussing this matter, as it is now engaging the attention of a Joint Select Committee of both Houses of Parliament, and comment would be inappropriate and inadvisable—and, I venture to say, very wrong. It is, however, desirable to tell you that your Board deemed it wise that, as some unforeseen delay arose in the appearance of one of the parties before this Inquiry, the moneys which had been collected during the operation of the tariff in excess of what would have been paid had there been no tariff, should be refunded to our consumers unconditionally, and at once. That is being done. For this purpose, they decided—and the Government Auditor agreed—that an appropriation from the Special Purposes Fund of £30,000 (the estimated amount of the refund and its expenses) would be a justifiable measure.

Another reason why the balance of the revenue of the Company is adversely affected is that your Directors decided not to pass on to the consumer the extra 1s. per ton on coal as soon as they might justifiably have done. It happens, therefore, that for the first ten months of the year there was no corresponding increase in the price of gas, and, moreover, the benefit of an increase in the revenue from coke was not realized on a large number of contracts which expired only at the end of the half-year. In conformity with the national awards, we have also had to provide for increases of wages which, in a full year, will amount to some £35,000. This, too, has affected the balance carried to the net revenue account.

POINTS FROM THE REPORT.

The Report has already told you of the main results of the year's working, and you will doubtless wish me to amplify some of the paragraphs.

The quantity of gas supplied to the area covered by the South Metropolitan Gas Company was 1·12 per cent. less than in the previous year. On the other hand, developments in the South Suburban area caused that Company to require a larger volume of gas in bulk than in the previous year, and thus the increase in the gas sold by the South Metropolitan was 0·48 per cent. over that of 1935. One of the factors that leads to economy in the use of gas to domestic consumers is the greater efficiency of gas appliances made available to them. And in this respect it is encouraging to note how very large is the increase in the value of appliances taken on hire-purchase. The departments concerned with the development of this side of the Company's business are to be congratulated upon the result of their energies; and it is to this aspect, amongst others, of the Company's business that I referred when speaking of the necessity for adjustment.

PUBLIC LIGHTING CONTRACTS.

You will remember that last year Dr. Carpenter spoke with deep regret of the loss of our public lighting load in the Borough of Camberwell. This year I am able to report to you that we have been chosen to complete the re-lighting of the whole of the Borough of Wandsworth that lies within the Company's area of supply—a length of streets amounting to 107 miles. In addition, we have received an order to re-light the major portion of the Borough of Lambeth, which lies almost wholly in our area. We are installing the new "Supervia" directional system of lighting which was demonstrated to you in this Hall two years ago. I think that a night visit to those roads which have already been completed will allow you to prove to yourselves that, if applied according to the latest scientific principles, gas gives place to no other form of lighting in its effectiveness, and that

the demonstration thus provided is an effective advertisement of the Company's chief product.

In the matter of the gas manufacturing process, there is little of significance to report, except to say that the efficiency of our process continues to be maintained at the high standard to which we are accustomed. Among bye-products, coke, which yields us the greatest total revenue of all, provides a most useful contribution. The policy of the London and Counties Coke Association is to be commended in that, despite the excellent demand for the product, the price has been increased only in proportion to the extra cost of coal. No small merit is due to the Association for the pains it has taken in successfully inducing the producers of coke to improve the quality of their material, and to make coke an article the demand for which is hardly met by the quantity available for sale. "Metro-Coalite" is also a fuel which has established itself with the domestic consumer, and I am pleased to report that we are able to-day to manufacture it at a profit to the Company. An important development at our Chemical Works is the purchase of ammonia from other undertakings, and the working of it up into sulphate of ammonia. It has been found that the centralization of manufacture is not only profitable to the gas undertaking from which we collect the ammonia, but by its contribution towards the reduction of working costs it enhances the revenue of our Company.

A Veneer Carpet for Roads.

The preparation and grading of road tar have become an important part of our business, and, as the Report tells you, the development of a new veneer carpet for roads is a matter which has aroused the interest of local authorities.

To turn now to our Parliamentary activities, you will recall that last year you sanctioned the re-introduction of a Bill which, among other provisions, was designed to secure the legalization of a meter to record consumption directly in therms instead of cubic feet. This aim had been very dear to the President's heart for a number of years, and it was a great personal triumph to him when, in spite of the opposition of the Board of Trade and the London County Council, a Select Committee of both Houses of Parliament unanimously approved of his proposal, and the Bill accordingly received the Royal Assent in July last.

The Report again contains a paragraph which I am sure will be a cause of much gratification to you. It tells you that the health of the Company's employees is such as to merit the envy of many an industrial undertaking in this country, and it attributes this happy circumstance to the conditions, mental, physical, and material, which Co-partnership creates. I can assure you that the year has not been an easy one for the Company's servants, particularly the outdoor staff; but, whatever the strain and disappointment of the autumn, one thing is certain: the spirit of co-partnership and the loyalty of your employees have emerged stronger than ever, and have proved once more the wise and kindly foresight of Sir George Livesey, who found so faithful a follower in Dr. Charles Carpenter.

I have now to move:

> "That the Report and Accounts now presented be received and adopted, and the Report entered on the minutes."

Mr. Benjamin R. Green: In seconding the resolution which has just been proposed by the Chairman, may I be allowed to say a word of congratulation to him on his excellent address? He has given us a most interesting and instructive speech. Perhaps it is what we would expect of him. If that be so, all I can say is that he has not disappointed us. ["Hear, hear."] But he has said nothing to you of the thousand and one problems which have beset him on being suddenly called upon to take over control of this important undertaking. Neither, of course, has he said anything of the able manner in which he has dealt with them. But shareholders will appreciate what this change has meant to him, coming, as it did, at a somewhat difficult juncture. He is assured of the loyal support of the Board, of the Staff, and of all the Co-partners; and I am confident that shareholders also will express their complete confidence in him presently. We all deplore the illness of the President, which is the cause of his absence to-day, and all we can do is to hope that the steady progress he is making towards recovery will continue. ["Hear, hear."] I have great pleasure in seconding the resolution.

The Vice-President: The Report and Accounts are now open for discussion.

No questions having been asked, the Vice-President put the resolution to the meeting and it was carried unanimously.

Dividends.

The Vice-President next moved, Mr. Green seconded, and it was agreed:

> "That the following dividends be now declared, viz.: On the 6 per cent. Preference Stock a dividend of 3 per cent. and on the 4 per cent. Preference Stock a dividend of 2 per cent. for the half-year ended 31st December, 1936; and on the Ordinary Stock a dividend of 3 per cent., making, with the interim dividend of 2½ per cent. paid in respect of the first half of the year, a dividend at the rate of 5½ per cent. per annum for the year ended 31st December, 1936; and that warrants be transmitted to the registered addresses of the Proprietors by post for the amounts of such dividends."

The Vice-President: I have now to propose that Mr. A. M. Paddon and Mr. A. B. Pasmore be re-elected Directors of the Company. I need say nothing about Mr. Paddon; you know him well. His services are of the greatest value to the Company. Mr. Pasmore took the place of the late Mr. Frederick McLeod, and is now up for election for the first time by the shareholders.

Mr. Green seconded the motion, which was agreed to.

The Vice-President: We have now to elect an Auditor in place of the late Mr. J. H. Fry, and I will ask a Proprietor to move a resolution.

Mr. T. Whittaker proposed that Mr. F. J. Bradfield be elected an Auditor of the Company.

Mr. R. V. de B. Crawshay seconded, and it was agreed to.

Mr. Bradfield: I am extremely grateful to the shareholders for this election. Needless to say, I assure them that I shall always do my utmost to carry out the duties to their satisfaction.

Votes of Thanks.

The Vice-President: Now there are a few words which I greatly desire to say to you. I want to propose a hearty vote of thanks to the whole of the Staff, and I should like to add a personal tribute of my own. During the past four months I have had the help and encouragement of individual Co-partners, and of the Co-partnership Committee, which have made what might have been a very difficult position a comparatively easy one. I venture to say that, without that help and encouragement from the Staff and Co-partnership Committee, both individually and collectively, neither I nor anybody else could have carried on. I have been a steady believer in Co-partnership for years, and the last few months have fully demonstrated what a big concern like this, with the loyal spirit of Co-partnership, can accomplish. You have been very kind to me to-day; for it is not an easy position that I occupy. I have worked for 25 years with Dr. Carpenter, and for over 50 years no one has addressed an annual meeting of this Company but the late Sir George Livesey and Dr. Carpenter. Thus I feel to the full my responsibility, and the honour that has been done me. In proposing this hearty vote of thanks to every member of the Staff, from top to bottom, I should particularly like to mention the help accorded me by Mr. Evans. Not that he has given more help than others, for they also have given of their best; but Mr. Evans has been longest in the position of Joint Manager, and I have been very closely in touch with him.

The vote of thanks was seconded from the body of the Hall, and carried by acclamation.

Mr. E. V. Evans: I know I am expressing the feelings of all employees of this Company when I say we are very highly appreciative of the recognition which you have once again accorded us. The past year has been an outstanding one, in that it has called for a series of special efforts. I have never seen, in the history of this Company, a finer example of unity of effort. There have been many instances of what I would call Applied Co-partnership. Not only have you a body of loyal workers, but you have men who are sure of themselves in what they do, and are sure of the future of the Industry that employs them. It is an honour to be associated with this Company, and we are very proud indeed to be attached to it. I use the word "attached" purposely, because it has a rather pleasant double meaning. I thank you, Sir, for the terms in which you have proposed this vote, and you, ladies and gentlemen, for the way in which you have received it.

Mr. T. A. Braddock: In proposing a sincere vote of thanks to the Vice-President and Directors of the Company, may I be allowed to say, from the body of the Hall, how deeply we deplore the illness of Dr. Carpenter, and to express the hope that he may soon be restored to health. The Vice-President has spoken in appreciative terms of the Staff, but he has said nothing of the Directors. We owe a deep debt of gratitude to the members of the Board for their services, and it is only fitting that we should express our thanks. The duties of people in responsible positions are always exacting, but recently there have been especially strenuous times, with which the Board have had to contend. Those of us who are interested in the Industry have admired the way in which the Board have tackled their problems.

Mr. Crawshay seconded the vote of thanks to the Directors, and it was carried with applause.

The Vice-President: On behalf of the other members of the Board and myself, I thank you all very much for the manner in which you have accorded this vote of thanks. It must have been a disappointment to many of you to receive rather less dividend on the present occasion, but the kindly way in which you have regarded our efforts has given me very great pleasure.

THE ANNUAL MEETING OF

The Gas Light and Coke Company

The Two Hundred and Thirtieth Ordinary General Meeting of the Proprietors of the Gas Light and Coke Company was held on Friday, Feb. 5, at the Chief Office of the Company, Horseferry Road, Westminster, S.W.—Sir DAVID MILNE-WATSON, LL.D., D.L. (the Governor), presiding.

The ASSISTANT SECRETARY (Mr. B. F. Wood) read the notice convening the meeting, and the Corporate Seal of the Company was affixed to the Register of Holders of Capital Stocks.

The GOVERNOR said: Ladies and Gentlemen,—I propose, with your permission, to take the report and accounts as read, and I will, therefore, immediately proceed to deal with the accounts.

You will see from the capital account that we have spent £5,000 on lands; £170,000 on buildings and machinery; £222,000 on mains and service pipes; £403,000 on meters, and £880,000 on stoves; a total of £1,680,000. Against this expenditure we have written off £674,000, the principal items of which are depreciation on steamships, meters, and stoves.

The item "buildings and machinery" includes three new steamships, with a total tonnage of 11,700. We needed to carry more coal, and, foreseeing that the cost of freights was likely to advance, we placed the order for these three steamers, and on very good terms. They were launched in April, May, and September, being named the s.s. *Mr. Therm*, *Icemaid*, and *Gas Fire* respectively. We sold one steamer which was out of date, and our fleet now numbers 20 ships. We may consider that we have now a very efficient fleet, and it has enabled us to reduce the number of ships we should have had to charter, at the greatly advanced freights now ruling.

CAPITAL ISSUES.

During the year we have raised a considerable amount of capital, all of it, I am sure you will agree with me, on very advantageous terms. In April we issued £700,000 3½% Redeemable Debenture Stock, 1956, at par. In November we issued £2,000,000 3¾% Redeemable Preference Stock, 1970, at par, and just before the end of the year we issued £993,000 of the same Stock at 100¾% net. The public issues were heavily over-subscribed. Although individuals may have felt disappointed that the allotments were so small, from the Company's point of view the results were most satisfactory as showing how highly the investing public appreciates the Company's securities.

You will, no doubt, be interested to know why the Company should continue to require so much more capital. The principal reason is that we have found within the last few years that unless the Company was prepared to finance its consumers to the extent of making it easy for them to acquire up-to-date appliances, we should not be able to continue to progress as we have done in the past. Up to quite recently, the gas cookers and gas fires in this country and elsewhere were mostly heavy, black, and, if I may say so, not very comely. They were very strong and could take any amount of kicks and blows without being damaged, but no one could say that they were ornamental, and they were out of keeping with the modern housewife's idea of what was suitable for her kitchen, sitting-room, or bedroom. Unfortunately, while a large number of our consumers did not like the black cookers and black fires, most of them were not in a position to put their hands in their pockets and buy the modern enamelled cooker and coloured fire. It was quite evident, therefore, that unless the Company was prepared to do something in this connection, our consumers might become dissatisfied and might well fall easy converts to the blandishments of the salesmen pushing other methods of cooking and heating.

SUCCESS OF HIRE-PURCHASE.

The Directors decided, therefore, that the only thing for them to do was to finance the consumers and let them have new enamelled cookers and coloured fires on hire-purchase terms. The same thing was true of refrigerators. It was found that practically no business could be done when it was a question of selling a refrigerator at, say, £30 for cash, but when it was offered at 2s. 6d. a week the public literally clamoured for them.

This policy has met with the greatest success, and during 1936 we have sent out various gas appliances on hire-purchase to the number of over 270,000. This includes 93,000 cookers, 101,000 fires, 13,000 refrigerators, and 61,000 water heaters.

I may point out that the method of sale upon hire-purchase has been very thoroughly tried out in this country in many branches of trade, and it has been found that among all classes of consumers, in good times and in bad, the record of honest dealing is extremely high, and the percentage of defaults almost negligible. Our own experience over a number of years fully confirms this.

SALES OF APPLIANCES.

Last year I told you of the very remarkable totals reached by the appliances issued and installed on the Company's area during the year. The figure was over 600,000, and, as I then pointed out, was equal to an appliance issued every minute, night and day, workdays and holidays, throughout the year. It might have been thought that this figure would prove to be somewhere near the limit, but 1936 has seen it increased by nearly 25% to 749,936. [Applause.] This total included 397,450 cookers, against 364,289 last year; 184,114 fires (not including coke fires), against 151,137 last year; and 99,447 water heaters, compared with 66,078 last year. So there has been an increase under every heading.

The Company's resources in personnel and training for meeting the great volume of work imposed by these sales have improved, and on the whole we have experienced less strain at peak periods than last year, though the work itself has been heavier.

Our total sales, for cash and upon hire-purchase, reached the figure of approximately £2,800,000—an increase of £900,000 over the 1935 figure of £1,900,000, which was itself an increase of three-quarters of a million over the previous year. It is a story of continuous progress. Our appliance revenue from all sources—sale, hire-purchase, and hire—rose from £2,600,000 in 1935 to £3,600,000 in 1936.

There has been an increase of 41,166 in our number of meters in use, bringing the total to 1,604,113. We have laid 164 miles of new mains, bringing our total length of mains to 5,940.

INCREASE IN GAS SALES.

Now coming to the revenue account, I am glad to be able to report that sales of gas have gone up by 3·69%. [Applause.] Both the ordinary and the automatic consumption shows an increase. This I am sure you will all regard as most satisfactory. We were favoured during a great part of the year with suitable weather, from the Company's point of view, however much it may have been resented by the public from the point of view of enjoyment. We had, in fact, what might be described as "gas weather." We also had the advantage of the extra day in leap year. But, making all allowances for these adventitious factors, it may interest the stockholders to know that there was a genuine increase in the extent to which the public was using our gas. The sales of gas brought in an increased revenue of about £322,000. Part of this was due, however, to an increase in the price of gas, which we advanced by 0·1d. to 8·7d. in February last, the reason for which I fully explained in my speech last year.

The rental from meters shows an advance of some £25,000, and there is a large advance in the rental from stoves of £196,000. This is the rental from the new cookers we are sending out to which I referred a few moments ago.

VIRTUES OF COKE.

Coke shows an advance of £281,000, coke prices all over the country having increased owing to the rise in the price of coal and the increased demand for coal and coke. But apart from this the increase in the quantity of coke sold by the Company to the public reached the large figure of 211,000 tons. During the month of December the Company's transport fleet created a record by making 72,000 deliveries, totalling just under 50,000 tons of coke—an average of 1,968 tons during each working day of the month. This daily delivery rose to an actual peak on Dec. 23 of 2,800 tons, or 56,000 sacks of coke.

It is evident that the virtues of coke as a smokeless solid fuel are winning their way very rapidly in public favour. There are, for instance, very large numbers of people in this country who will not lightly give up the pleasures of a solid fuel fire in their living room, and you will agree with me that the gas industry is doing them and itself a very good service by providing them

with a coke fire, free from the two great defects previously associated with solid fuel.

The gas-ignited coke fire cuts down to an almost negligible minimum the work associated with lighting and cleaning fires, and it does not pollute our skies with smoke. It is no wonder, therefore, that the increase in coke grates installed in the Company's area goes on apace.

Expenditure.

Turning to the debit side of the account, you will find that coal has cost us nearly half a million pounds more, partly due to the voluntary 1s. on the price we paid and partly to the fact that we purchased an additional 326,000 tons of coal to meet the increased demand for gas and to enable us to reduce the use of oil for the manufacture of carburetted water gas, which, owing to the high price of coke, has become unprofitable. You will see this is reflected in the fact that we paid £73,000 less for oil than in the previous year, and coke for water gas is down by £21,000. The extra tonnage of coal purchased by the Company represents employment for an additional 1,000 miners throughout the year. In this way, we have made a very good contribution to the welfare of the miners in the coal industry. [Applause.]

We spent nearly £82,000 more on repairs and maintenance of works and plant. This is due very largely to the modernizing of the plant of our Southend works. There have been further extensions to the benzole plant; and there has been continued work under a pre-arranged programme for the replacement of old holders and their maintenance in a high state of efficiency. At Canvey Island there is an innovation—a new high-pressure gasholder in the form of a sphere—the first of its kind in the country.

Coming to the sale of gas, distribution has cost more under almost every heading, as might well be expected, inasmuch as, apart from the increased sale, competition has greatly increased, and we have to spend more to meet that competition, let alone keeping our appliances thoroughly up to date.

Result of Year's Working.

The result of the working of the year is as follows:—The balance transferred from the revenue account to the profit and loss account is £2,093,000, as against £2,071,000 for the previous year. This balance, after adding the sum of £3,700 received from H.M. Treasury under the Development Act, 1929, and after allowing for interest on borrowed money for the year and dividends distributed in respect of the June half-year, leaves a sum of £907,000 out of which to pay dividends for the December half-year. This sum enables the Directors to recommend the usual dividends on the Four per Cent. Consolidated Preference Stock, the Three-and-a-Half per Cent. Maximum Stock, and a dividend (unchanged) at the rate of £5-12s.% per annum on the Ordinary Stock.

The payment of these dividends, together with the necessary contribution of £20,000 to the Redemption Fund in respect of the half-year ended December last, will absorb £694,000, leaving £213,000 to be carried forward to the credit of the current year's accounts, as against £203,000 carried forward on the last occasion.

With regard to the balance-sheet, you will notice that we have further analysed the stores on hand in order to show separately meters and transport, as these are now large items. The meters and stoves on hand show an increase because of the growth in the number of consumers, which involves keeping a larger stock. The additional transport is needed in order to handle the extra meters, stoves, and domestic coke deliveries. Incidentally, I may mention that the transport fleet covered in all 7,000,000 miles in 1936, an increase of 1,000,000 miles over the previous year's figure. I do not think there are any other items on that side of the account which call for comment.

Parliamentary Bills.

We had two Bills before Parliament. No. 1—a Money Bill to enable us to raise Preference or Ordinary Stock to the extent of £3,000,000—met with practically no opposition. A very different fate awaited No. 2 Bill. This was opposed by no less than 28 local authorities. For four days it was before a Committee of the House of Commons, which unfortunately came to a decision in our favour too soon and without hearing all the opposition. The matter was therefore referred back to the House of Commons, and a fresh Committee was appointed. This is unprecedented in the history of gas legislation. The proceedings before this Committee lasted five days, and it unanimously decided in our favour. The local authorities again opposed the Bill in the Upper House, and after a hearing of seven days the House of Lords Committee decided in our favour. [Applause.] This Bill was, therefore, subjected to 16 days' hearing and cost the Company some £7,000—all in order that we might obtain what would seem to be the most reasonable right—namely, to put gas pipes at our own expense in Council houses. ["Hear, hear."]

Stockholders may expect me to say something about the Joint Select Committee which has been set up by the Government following upon the introduction last year of the South Metropolitan Gas Company's compulsory tariff. The Committee has been appointed, not only to enquire into the powers of the South Metropolitan Gas Company, but also into the powers possessed by all basic price companies. As the matter is *sub judice*, it would not be right for me to express any opinion on the subject beyond saying that this Company will be represented before the Joint Committee, and is prepared to give evidence if asked to do so.

Housing of Working Classes.

One of the chief concerns of this Company is the housing of the working classes. You may ask me why that particularly affects us. This is easily answered, the reason being that a very large part of our consumption comes from the people who dwell in working-class houses. In recent years, owing to slum clearance, there has been a tendency to erect blocks of dwellings which present new problems, and offer new opportunities in the provision of heat for all purposes. As we believe that practice is better than precept, we decided that it would be a great advantage if we could show a model gas service at work in a model block of flats. We have constructed, therefore, on a spare piece of ground at Kensal Green, a thoroughly modern block of working-class flats where gas will be used in what we consider to be a full and proper way.

This is a practical demonstration for all of us who are interested in these matters, and I am glad to say that Sir Kingsley Wood, Minister of Health, considers this matter of such importance that he has very kindly agreed to come and open this building next month. This step has been taken through the medium of the Capitol Housing Association, Ltd., with the aid of subsidies provided for under the Housing Act of 1923.

Research and Training Centre.

You are, no doubt, aware that for many years this Company has had a research and training centre at Nine Elms for those engaged in the Gas Sales Department, generally known as Watson House. Owing to the vast expansion in research and training work, the premises there had become too cramped, and the Directors decided, therefore, to transfer this work to a site at Fulham where we had already in existence buildings which would, with very little alteration, be suitable for the work. The conversion was completed last year and the new Watson House was opened by Lord Snell (the Chairman of the London County Council) on Dec. 3. Nothing but praise has been bestowed on the new premises which are commodious and well suited for the work.

We are carrying on fundamental research, practical research, the routine testing of all materials and appliances used and supplied by the Company, and the training of apprentices and assistant fitters in their work. There are 33 research chemists and physicists engaged there. There are 257 apprentices in training throughout the Company's area, 70 of them at Watson House. In addition, salesmen, showroom attendants, fitters, and assistant fitters attend "refresher classes" to keep themselves up to date, at the rate of about 250 per week.

New Showrooms.

In pursuance of a plan of making our showrooms as accessible as possible to all our consumers, we opened six new showrooms during the year—at Leigh-on-Sea, Kingsbury, Edgware, and Dagenham, in Oxford Street, and one of very special interest in the City itself. This was the first time that the Company had been represented in its own premises within the City square mile.

The Lord Mayor kindly performed the opening ceremony, and City circles seemed to be very much interested and pleased by Mr. Therm's first personal appearance among them after acting as the servant of the City for 125 years. [Applause.] In addition to these new showrooms, reconstruction work was also carried out at the Ilford and Ealing premises.

Flueless Gas Fires.

One interesting event during the year has been the issue of a report by a Special Committee of the Royal College of Physicians on the question of flueless gas fires. The investigation leading up to this report was carried out at the instance of this Company, which wished to be informed whether in developing the sale and use of these appliances it was acting in accordance with the highest standards of public health and comfort.

The preparation and issue of the report was itself a notable event, because it is the first report ever issued on any subject by the Royal College of Physicians. I need hardly say that, having regard to the circumstances in which it was prepared and to the extremely distinguished names associated with it, no one, either inside the Gas Industry or outside it, need have the slightest hesitation in accepting these findings. These, in confirmation of the effect of an interim report issued a year or so earlier, were wholly favourable to the gas flueless heater when installed and used in normal and appropriate circumstances. These findings are of great interest and value to us, and are an encouragement to go on and develop a very useful section of our business.

Public Lighting.

The growth of the Company's work in public lighting continues, and the total number of street lamps which we have installed and maintained has grown to over 52,000. The new long-term

tracts obtained during the year include those from the roughs of Chelsea and Hendon, each for 15 years, the latter vering 10 miles of main and arterial roads; and 10-year con-cts from five other local authorities. I expect you have liced of late various suggestions to the effect that novel thods of lighting developed by some of our competitors have me sort of special claim upon the nation's interest and make me peculiar contribution to the problem of road safety. I would like to make myself perfectly clear on this point. ere are a great many technical questions and issues connected th road lighting—questions about the positioning of lamps, e method of diffusion, and the type of effect that should be med at. Experts differ on these points as they do about most ings. None of these issues, however, is equivalent to an issue tween gas and any other method of street lighting. As far the practical effect is concerned, whatever can be achieved by y other method can be achieved by gas lighting, which is fficiently adaptable to yield any type and degree of illumina-on that is planned for it—without the need of introducing any aveyard effects or blue limelight. [" Hear, hear."]

Need for Uniformity.

We are entirely in favour of uniformity in street lighting for e sake of road safety, if by that is meant an absence of con-sts between the intensity and the diffusion of light in different ctions of road. I would warn members of the public, how-er, not to be led astray by specious talk into the belief that iformity involves handing over the public lighting of our cities one particular type of lamp or form of energy. There is no ed to warn those who are technically well acquainted with e facts, because the gas industry is continually receiving sub-ntial contracts for main-road lighting, with the full approval the experts attached to various local authorities and with e goodwill of the Ministry of Transport.

Growth of Industrial Business.

One of the most satisfactory of many good features in a suc-essful year's work has been the continued growth in the Com-any's industrial business. As you are aware, the coming of any new industries to London and the development of old ones s offered the Company opportunities which it has endeavoured seize to the full. Through the development at Watson House a great variety of special appliances gas has been introduced a vast field of new uses in the factory and furnace. The very bstantial increase in this part of our business which took lace in 1936 is attributed not merely to the virtue of gas for ese purposes, but to the effectiveness of the block rates and ecial tariffs which have been worked out to enable us to secure is large-scale business in the strenuous conditions of a hotly ntested market.

The increased use of gas in industry represents a very sub-ntial contribution by the Gas Industry to the national well-eing. The replacement of older methods of industrial heat ovision by gas accelerates and improves output, reduces the mount of waste and spoiling through exact control of tempera-re, and provides improved working conditions. Moreover, it rves very effectively the nationally desirable cause of smoke atement. I wonder whether you have ever pictured what ondon of to-day, with its hundreds and thousands of new fac-ries, would be like if every furnace still meant, as it once would ve meant, a chimney pouring black smoke into the sky. nally, this industrial business is of the greatest benefit to the ompany's general position by stabilizing and spreading de-and, by helping materially to bear the general burden of over-eads, and thus benefiting every other aspect of our business nd every grade of consumer.

Coal Position.

I must turn now to a less satisfactory portion of my review of e year's events. The coal position in the country is causing considerable concern. It is true that, so far, we in this ompany have not felt to any great extent the new prices, ecause at the present moment we have bought our supplies. But e situation in general cannot be viewed without serious ap-rehension, and the time is, of course, not far distant when we ust renew our coal contracts.

Ever since the Coal Mines Act of 1930 came into operation all oal consumers, and particularly large consumers like Gas Under-akings, have had reason to fear that it might be used in a anner detrimental to their interests, and those fears are, un-ortunately, now being realized. The system of quotas and inimum prices previously set out under schemes covering all e colliery districts with a view to raising coal prices, failed o effect its purpose, and a revised set of schemes has now een put in operation. Each of these schemes enacts that the ontrol of coal buying and selling in the district shall be vested n the District Coal Board, and all the Boards are composed xclusively of coalowners.

A Complete Monopoly.

A complete monopoly has thus been created, and the competition upon which we and others formerly relied to enable us to get the coal we required at reasonable prices has ceased to exist. The District Coal Boards are free to fix whatever prices they like for their coal, and to discriminate as they please between one customer and another; prices need have no relation to costs, and the profits are in no way controlled.

In these circumstances it might have been expected that the Legislature would have provided adequate safeguards in order to prevent coal consumers being exploited, but the Committees of Investigation, for which provision is made in the Coal Mines Act, have proved themselves useless for that purpose. We hope that adequate safeguards will be introduced.

Public Dissatisfaction and Anxiety.

The price of coal is being raised considerably and the absence of any proper control is naturally causing dissatisfaction and anxiety in the minds of the coal-consuming public.

Coalowners throughout the country would be well advised to realize that, long-suffering as we are as a nation, abuse of a monopoly in a commodity of vital national importance like coal will not be endured for any length of time, and that, unless they exercise in a reasonable manner the powers which have been conferred on them, there is bound to be trouble.

Company's One Hundred and Twenty-Fifth Birthday.

And now let me end on a more cheerful note. I have no doubt it will interest the stockholders when I tell them that this year the Company celebrates its one hundred and twenty-fifth birthday. [Applause.] It is difficult to find a proper title for such an occasion—a centenary *plus* a silver jubilee—as all the precious metals and jewels have been appropriated for other long-term anniversaries, and there is nothing left to stand for five silver jubilees rolled into one. And when one thinks of the small beginnings 125 years ago—the story I have told to-day is a most striking instance of growth.

From very small beginnings, when light was the only thing supplied, the Company has conquered not only light but heating, cooking, refrigeration, and a great part of the water-heating and industrial field. It is interesting to remember, too, that we lit Pall Mall in 1812 and we are still lighting Pall Mall in 1937.

Comparison with Electricity.

Speaking of progress, may I add one final point? I am not sure whether the review which I have given you of our year's working and the increases in sales will convey to you the true extent of the progress which the Company has made. An increase in gas sales of 3·69% may not, on the face of it, seem a very spectacular figure. From time to time we have to congratulate our electrical friends on increases of the order of 10 or 15%, and possibly some people think that the older industry, while it manages to hold its own, and perhaps a little more, is not really keeping pace with its new friend and competitor.

But let us look a little closer. We have taken note of the total output and increased sales of electricity on our area, and have been able to make an extremely close estimate based on official sources of what the figures amount to. We find that your Company's sales of gas in 1936, expressed in terms of heat values, were about eight times the sales of electricity for heating, lighting, and cooking. This excludes the sales for power purposes, which bear no relation to the activities of the Gas Industry; but, incidentally, our total sales were over three times the electrical sales for all purposes, including power. [Applause.] From this you will see that our additional gas sale of 3·69% means a good deal more than might appear. Actually it represents an increase over three times as great as the increased electrical sales for lighting, heating, and cooking in the last year for which figures are available.

If we include the coke sold on our area for purposes other than power production, we find that the increase in gas and coke sold, in terms of heat value, was over eight times the electricial increase for all purposes, and some 20 times the increase in electricity sold for lighting, heating, and cooking.

Confidence in the Future.

On several occasions in recent years the Gas Industry has had the entertainment of reading its own obituary notice in the columns of various enthusiastic trade and other journals. If I may borrow an observation of Mark Twain in similar circumstances, I think you must agree with me that in the light of the facts I have just given you, the reports of the Gas Industry's death are grossly exaggerated. [Laughter.]

On the contrary, I feel assured that we can look forward to 1937 and the years that follow with a robust confidence in what

the future has in store for the Industry and the Gas Light and Coke Company in particular, and in our own power to meet, overcome, and even wrest to our advantage whatever difficulties may be in front of us. I am sure you will agree that this is not an inappropriate statement to make on our 125th birthday, and with a business which has not only held its own for this period of time, but is still growing stronger than ever.

Work of Employees.

I cannot close without saying how much the Directors appreciate the work that has been done by the employees of the Company, from the highest to the lowest. They have worked at high pressure all the year and with splendid enthusiasm. I would like to thank them for their efforts.

With this, I formally beg leave to move:

> That this Meeting do agree with and confirm the Report of the Directors and the Auditors' Report and Statement of the Accounts of the Company for the year ending Dec. 31, 1936.

The Deputy-Governor (Mr. Henry Woodall, M.Inst.C.E.): It is almost an unwritten law that at these meetings the Deputy-Governor formally seconds the various resolutions. For a number of years I have done this, and only transgressed once—ten years ago, when Sir David received his Knighthood. To-day I make no apology for saying a very few words and thanking our Governor, as you will do later, for his inspiring and most interesting speech. ["Hear, hear."] This, as you have been told, is the 125th anniversary of the Company. Few undertakings attain the age of 125, and fewer still at that age retain youthful vigour. The record of last year's work and progress shows how strong and vigorous our old Company is. The Governor had a great story to tell, and you will agree that he told it wonderfully well. It is the hope of us all that he will long continue to guide the Company's destiny and give us addresses such as we have just listened to, which inspire, hearten, and encourage all those interested in the important and flourishing Gas Industry. I have much pleasure in seconding the resolution.

The Governor: Before putting the proposition to the meeting, I shall be happy to hear any remarks which Proprietors may wish to make, and to endeavour to answer any questions they may ask. If no one wishes to say anything, I will put the resolution. It is carried unanimously.

Dividend Minute.

The Assistant Secretary then read the Minute of the Court of Directors, dated Jan. 22, 1937, recommending Dividends for the past half-year:

> Resolved.—That it be recommended to the Ordinary General Meeting of Proprietors to be held on the 5th proximo that (1) dividends as follow for the half-year ending the 31st December, 1936, be declared, viz.:

	£	s.	d.	
On the 4% Consolidated Preference Stock at the rate of	4	0	0	per cent. per annum.
On the 3½% Maximum Stock at the rate of	3	10	0	,, ,,
On the Ordinary Stock at the rate of	5	12	0	,, ,,

All subject to deduction of Income-Tax.

> (2) In accordance with the provisions of Part III. of the Company's Act, 1931, the sum of £20,000 be set aside towards the Redemption Fund.

The Governor: I beg leave to move the adoption of that recommendation.

The Deputy-Governor seconded the resolution, which was unanimously agreed to.

Elections and Thanks.

The Governor: Two Directors, Mr. Henry Woodall and Sir Reginald James Neville Neville, Bart., retire by rotation at this meeting, and offer themselves for re-election. I beg leave to move that Mr. Henry Woodall be re-elected a Director of the Company. Mr. Woodall is probably the oldest Director, and possesses, of course, an unrivalled experience in gas matters, not only in this Company, but in other Companies which he controls. He is a very great help to the Directors, and to me personally, and I am delighted that we have him with us to-day.

Mr. Robert M. Holland-Martin, C.B., seconded the motion, which was carried, and acknowledged by Mr. Woodall.

The Governor: I now beg leave to move that Sir Reginald Neville be re-elected a Director of the Company. He, also, is an old Gas Director, who came over to us from Brentford, where he too, had great experience in gas matters.

Mr. R. M. Holland-Martin seconded this proposition, which was agreed to.

Sir Reginald J. Neville Neville, in acknowledgment, remarked that he was a Director of 45 years' experience.

Thereafter the Auditors (Messrs. P. H. Ashworth and H. E. Ibbs) were reappointed on the motion of Mr. H. L. Mann, seconded by Mr. T. C. Claxton.

Mr. F. Locket said that, on behalf of the Proprietors present, he would like to express to the Governor, Directors, and Staff, deep appreciation of all that had been done. He entirely endorsed Mr. Woodall's remarks with reference to the speech by the Governor to which they had just listened. It had been a most interesting and lucid account of the work of the Company, and presented an attractive picture which they would all like to study at home—as they would be able to do when they received their copies of the Governor's address. He himself regarded their Company as one of the most wonderful in the world. What, perhaps, appealed most to those who dealt with the Company was the marvellous service given, and this service could not be offered if the staff and employees were not inspired in their efforts by those at the head. They had in the Governor a man who inspired everybody who worked under him. This inspiration filtered through every grade in the service, and resulted in that loyalty and efficiency of which they had abundant evidence before them. There was one whose absence from the meeting they regretted. He referred to the Secretary, Mr. W. L. Galbraith, who, he understood, was not very well. On behalf of the shareholders, he would like to express sympathy with Mr. Galbraith, and the sincere hope that he would soon be restored to his colleagues in good health. He moved a hearty vote of thanks to the Governor, Directors, Senior Officers, Staff, and Employees of all grades—not forgetting the Captains and crews of the Company's steamers, who have experienced very rough weather during the last few weeks.

Mr. H. Rayner, seconding, said it was a somewhat significant fact that, throughout the whole of Sir David Milne-Watson's nineteen years of Governorship—he believed it was nineteen years—very few questions had at any time been asked by stockholders at these meetings. So far as memory served, not a single suggestion had been made on any occasion, and certainly no word of adverse criticism had been spoken. This was a sure sign of complete confidence in the Directorate.

The vote of thanks having been carried with applause, the Governor, in acknowledgment, said the kind thoughts that had been expressed were greatly appreciated. It was true that those who served the Company, in whatever capacity, were team workers. The Board were completely united; the senior officers were a happy family; and through the rank and file there permeated a desire to do the best possible for the Company. This was the secret of their success—putting the Company first in their thoughts. The vote which had just been passed would encourage them to carry on and do their best during the coming year.

Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

A much brighter atmosphere pervaded the House last week, and there was a welcome return to activity. Gilt-edged securities led the way, and the recovery of prices in this section influenced practically all departments. Home and foreign rails strengthened, and the home companies' dividend announcements which are expected this week are awaited with interest. The industrial market was also busy and prices quickly responded to the increased activity, a feature being the demand for iron, steel, and textile shares. Oils were strong, Leaseholds taking the lead, though some end-week profit-taking took prices to below the best. A large speculative movement took place in mining shares, while higher commodity prices had their effect on base metal shares. The week closed with a general feeling of confidence that the renewal of active conditions would continue.

This is the commencement of the *ex*-div. season in the Gas Market, and it will be seen in the Stock and Share Lists that a large number of ordinary and preference stocks were thus marked last week. Apart from these movements prices, with few exceptions, remained the same. In the London List the only two changes occurred in Alliance and Dublin 4% debenture with a rise of 4 points to 98½, and in Imperial Continental which closed 3 points lower at 156½. At the Provincial Exchanges, Liverpool ordinary, which at the time of writing is still *cum*-div., hardened a further point to 137, and in the Unofficial List Mid-Kent £10 shares also rose 1.

Dividend announcements are now coming in rapidly, and among those reported last week, all of which are at the same rates as a year ago, appear the following:

—	1st Half.	2nd Half.	Full Year.
	%	%	%
Bath	2½	3	5½
Cambridge 10%	5	5	10
,, 7%	3½	3½	7
Cardiff	3	3	6
Chester	2½	3½	5¾
East Hull	2½	2½	5
East Surrey	3	3	6
Great Yarmouth 8½%	4¼	4¼	8½
,, ,, 7½%	3¾	3¾	7½
Newcastle	2⅞	2⅞	5¾
Northampton	2½	2½	5
Shanklin and Ventnor	4	4	8
Southampton	2½	2¾	5¼
Sunderland	3	3	6
Tottenham	3⅜	3⅜	6¾
Watford	3½	3½	7
Weston-super-Mare	2½	2½	5
Weymouth	3	3	6

The United Kingdom Gas Corporation has acquired controlling interests in a further four companies, and the South Eastern Gas Corporation has made an offer to acquire all the issued ordinary stock of the Slough Gas and Coke Company, the terms of which appear very attractive.

Current Sales of Gas Products

The London Market for Tar Products.

Feb. 8.

The prices of tar products in the London market are as follows:

Pitch is slightly firmer, and the price is 34s. to 35s. per ton f.o.b.

Creosote, 5¾d. to 6d.

Refined tar, 3¾d.

Pure toluole, 2s. 4d. to 2s. 5d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, about 1s. 7d.; and 90/160 pyridine, about 8s. 6d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Feb. 8.

The average prices of gas-works products during the week were: Gas-works tar, 19s. 3d. to 24s. 3d. Pitch—East Coast, 34s. to 35s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 34s. to 35s.* Toluole, naked, North, 1s. 11d. to 2s. Coal tar crude naphtha, in bulk, North, 8d. to 8¼d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5½d. Heavy naphtha, North, 1s. 1½d. to 1s. 2½d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¾d. to 5¼d.; low gravity, 4½d. to 4¾d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 2s. 8d. to 2s. 9d. Naphthalene, £18 to £20. Salts, 90s. to 95s., bags included. Anthracene "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Feb.* 6.

With the exception of the Heavy Products all items are enjoying a steady and increasing demand, with the result that prices are tending upwards.

Crude gas-works tar.—The actual value is 35s. to 36s. per ton *ex* works in bulk.

Pitch is quietly steady at 30s. to 32s. 6d. per ton f.o.b. Glasgow for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar.—Prices for the coming season are not definitely fixed, but are expected to be in the region of 3d. per gallon f.o.r. for export, and 3¾d. per gallon *ex* works in buyers' packages for home trade.

Creosote oil.—Production is well looked after and prompt supplies are not too easily secured. Specification oil, 5¼d. to 5½d. per gallon; low gravity, 5¼d. to 5½d. per gallon; neutral oil, 5d. to 5¼d. per gallon; all *ex* works in bulk.

Cresylic acid.—Enquiries continue numerous and prices are rising. Pale, 97/99%, 2s. 11d. to 3s. 1d. per gallon; dark, 97/99%, 2s. 8d. to 2s. 10d. per gallon; and pale, 99/100%, 3s. 3d. to 3s. 6d. per gallon; all *ex* works in buyers' packages.

Crude naphtha continues to command 5½d. to 6d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha.—90/160 grade is valued at 1s. 3d. to 1s. 4d. per gallon, and 90/190 heavy naphtha at 10½d. to 11½d. per gallon.

Motor benzole is available at 1s. 3d. to 1s. 4d. per gallon.

Pyridine.—Prices are nominal at 6s. to 6s. 6d. per gallon for 90/160 grade, and 7s. to 7s. 6d. per gallon for 90/140 grade.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole	0 9	to	0 9½	per gallon at works
Motor ,,	1 2½	,,	1 3	,, ,, ,,
90% ,,	1 3½	,,	1 4	,, ,, ,,
Pure ,,	1 7½	,,	1 8	,, ,, ,,

These prices date from Jan 27, 1937, and for purposes of record should supersede those published in our issues of Jan. 27 and Feb. 3.

Contracts Advertised To-Day

Benzole Plant.
Sowerby Gas Department. [p. 352.]

Bolts, Nuts, and Rivets.
Stockton-on-Tees Gas Department. [p. 352.]
Stoke-on-Trent Gas Department. [p. 350.]

Coal.
Milford Haven Gas Department. [p. 352.]

Cocks, Couplers, &c.
Port Talbot Gas Department. [p. 352.]
Stoke-on-Trent Gas Department. [p. 350.]

Cookers and Fires, &c.
Port Talbot Gas Department. [p. 352.]

General Stores (Tools, Iron and Steel, Lead Pipe, Oils, Grease, &c.).
Port Talbot Gas Department. [p. 352.]
Stoke-on-Trent Gas Department. [p. 350.]

Lead Wool, &c.
Port Talbot Gas Department. [p. 352.]

Lighting Goods (Lamp Columns, Burners, Mantles, Brackets, Fittings, Pendants, Blocks, &c.).
Port Talbot Gas Department. [p. 352.]
Stoke-on-Trent Gas Department. [p. 350.]

Meters.
Port Talbot Gas Department. [p. 352.]
Stockton-on-Tees Gas Department. [p. 352.]

Pipes, &c.
Port Talbot Gas Department. [p. 352.]
Stockton-on-Tees Gas Department. [p. 352.]
Stoke-on-Trent Gas Department. [p. 350.]

Retorts.
Newcastle-under-Lyme Gas Department. [p. 352.]
Pontefract Gas Department. [p. 352.]
Stockton-on-Tees Gas Department. [p. 352.]

Washing Machines and Boilers.
Port Talbot Gas Department. [p. 352.]

Gas and coke production with the best advantages of scientific control . . . .

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- GLOVER-WEST VERTICAL RETORTS
- WESTVERTICAL CARBONIZING CHAMBERS
- COAL AND COKE-HANDLING & PREPARATION

Carbonizing Plants ordered in 1936 by—

THE **DUDLEY,** BRIERLEY HILL & DISTRICT GAS CO. (3RD ORDER)
THE **KELSO** GAS COMPANY, LTD.
THE **ALTRINCHAM** GAS COMPANY (3RD ORDER)
THE **BILSTON** GAS LIGHT & COKE COMPANY (2ND ORDER)
THE **GRANGEMOUTH** CORPN. GAS DEPT. (2ND ORDER)
THE **JOHANNESBURG** MUNICIPAL GAS DEPT. (3RD ORDER)
THE **BALLYMENA** U.D.C. GAS DEPARTMENT (2ND ORDER)
THE **WORCESTER** NEW GAS LIGHT CO. (2ND ORDER)
THE **YEADON AND GUISELEY** GAS CO. (2ND ORDER)
THE **CARLISLE** CORPORATION GAS DEPT. (2ND ORDER)
THE **DUMBARTON** CORPORATION GAS DEPT. (2ND ORDER)
THE **BELFAST** CORPORATION GAS DEPT. (6TH ORDER)
THE **DUDLEY,** BRIERLEY HILL & DISTRICT GAS CO. (4TH ORDER)
THE **GALASHIELS** GAS LIGHT COMPANY
THE **CHARD** CORPORATION GAS DEPARTMENT
THE **GUELPH** (ONT.) LIGHT & HEAT COMMRS. (2ND ORDER)
THE **ALLIANCE AND DUBLIN** CONSUMERS' GAS COMPANY (4TH ORDER)
THE **ROTHESAY** CORPORATION GAS DEPT. (3RD ORDER)
THE **NEWCASTLE-UPON-TYNE** AND GATESHEAD GAS COMPANY (5TH ORDER)

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STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Feb. 5.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,767,439	Stk.	Sept. 7	7⅞	8	Alliance & Dublin Ord. ...	171—176	...	...
374,000	,,	Dec. 14	4	4	Do. 4 p.c. Deb. ...	96—101	+ 4	...
557,655	,,	Aug. 10	7	7	Barnet Ord. 7 p.c.	168—173	...	...
300,000	1	Oct. 5	1 9⅜	1 4⅛	Bombay, Ltd.	26/—28/-	...	27/—27/6
179,305	Stk.	Aug. 10	9½	9½	Bournemouth sliding scale ...	220—230	...	223
590,407	,,	,,	7	7	Do. 7 p.c. max. ...	171—176	...	173—174
493,960	,,	,,	6	6	Do. 6 p.c. Pref. ...	148—153	...	149—150
50,000	,,	Dec. 14	3	3	Do. 3 p.c. Deb. ...	85—90	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	104—109	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
357,900	,,	Aug. 10	7½	7½	Brighton, &c., 6 p.c. Con. ...	168—173	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	154—159	...	...
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	145—150	...	...
855,000	,,	Oct. 5	8	7	British Ord.	157—162	...	159½
100,000	,,	Dec. 14	7	7	Do. 7 p.c. Pref.	148—153	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	112—117	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	109—114	...	...
200,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	99—102	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	...
150,000	Stk.	Jan. 4	4½	4½	Do. 4½ p.c. Deb. ...	80—85	...	...
626,860	,,	Feb. 1	6	6	Cardiff Con. Ord.	126—131*	−2	...
237,860	,,	Dec. 14	5	5	Do. 5 p.c. Red. Deb.	108—113	...	...
98,936	1	Oct. 19	2/-	2/-	Colombo Ord.	1⅞—1⅞	...	35/9
24,510	1	,,	1/4⅛	1/4⅛	Do. 7 p.c. Pref. ...	23/6—25/6	...	...
739,453	1	Oct. 5	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	17/6—19/6	...	...
296,144	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	21/—23/-	...	...
1,775,005	Stk.	Feb. 1	5	5	Commercial Ord.	91—96*	−2	91—93
620,000	,,	Nov. 30	3	3	Do. 3 p.c. Deb. ...	81—84	...	81
286,344	,,	Aug. 10	5	5	Do. 5 p.c. Deb. ...	122—127	...	126
807,560	,,	Aug. 10	7	7	Croydon sliding scale ...	158—163	...	...
644,590	,,	,,	5	5	Do. max. div.	115—120	...	117½
620,385	,,	Dec. 14	5	5	Do. 5 p.c. Deb.... ...	123—128	...	125—128
239,000	,,	Feb. 1	5	5	East Hull Ord. 5 p.c.... ...	107—111*	- 2	...
184,555	,,	Aug. 10	6	6	East Surrey Ord. 5.p.c. ...	128—133	...	...
176,211	,,	Dec. 14	5	5	Do. 5 p.c. Deb. ...	121—126	...	...
250,000	1	Nov. 16	6	4	Gas Consolidation Ord. ...	20/6—22/6	...	...
250,000	1	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	19/—21/-	...	19/6
19,255,284	Stk.	Feb. 1	5½	5½	Gas Light & Coke 4 p.c. Ord.	25 9—26/9a*	-- /6	25/10½—26/5½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	87—90*	−1	87—88
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	102—106*	− 2	103½—104¾
8,602,497	,,	Nov. 30	3	3	Do. 3 p.c. Con. Deb. ...	84—87	...	84½—86
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	115—118	...	116—117
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb....	114—117	...	115—115¾
700,000	,,	Sept. 7	...	25/5§	Do. 3¼ p.c. Red. Deb....	102—104	...	...
270,466	,,	Aug. 24	6	6	Harrogate New Cons. ...	128—133	...	...
213,200	,,	Aug. 10	6	6	Hornsey Con. 3½ p.c. ...	133—138	...	...
5,600,000	,,	Nov. 2	12	8	Imperial Continental Cap. ...	154—159	−3	154½—160
223,130	,,	Feb. 1	3½	3½	Do. 3½ p.c. Red. Debs....	92—97*	...	...
285,242	,,	Aug. 24	8½	8½	Lea Bridge 5 p.c. Ord. ...	186—191	...	...
11,751	,,	,,	10	8	Maidstone Gas 5 p.c. Cap. Stk.	190—200	...	...
63,480	,,	Dec. 14	3	3	Do. 3 p.c.Prp.Db.Sk.	79—84	...	...
75,000	,,	Nov. 30	†10	10	Malta & Mediterranean ... Metropolitan (of Melbourne)	150—160	...	154—155
392,000	—	Oct. 1	5½	5½	5½ p.c. Red. Deb.	100—105	...	102—103
231,978	Stk.	Aug. 24	5	5	M.S. Utility 'C' Cons. ...	111—116	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	102—107	...	104—104½
360,075	,,	Dec. 14	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	121—126	...	...
125,000	—	Jan. 4	3½	3½	Do. 3½ p.c. Rd.Rg.Bds.	97—100	...	...
675,000	Stk.	Nov. 16	†6	†6	Montevideo, Ltd.	80—85	...	81—82½
225,000	,,	Aug. 10	7½	7½	North Middlesex 6 p.c. Con.	170—175	...	...
396,160	,,	Feb. 1	5	5	Northampton 5 p.c. max. ...	108—113*	−2	...
300,000	,,	Nov. 2	†7	†9	Oriental, Ltd....	168—173	...	...
416,617	,,	Dec. 14	8	8	Plymouth & Stonehouse 5 p.c.	170—175	...	...
504,416	,,	Aug. 10	8½	8½	Portsmouth & Gosport Cons.	178—183	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	114—119	...	...
73,350	,,	,,	...	5	Do. 5 p.c. Pref. ...	118—123	...	...
363,470	1	Sept. 21	1/-	1/-	Severn Val. Gas Cor. Ld. Ord.	21/—23/-	...	22/6—23/-
454,510	1	,,	-/10½	-/10½	,, ,, 4½ p.c. Cum. Pref.	21/—23/-	...	...
133,201	Stk.	Aug. 24	5	8½	Shrewsbury 5 p.c. Ord. ...	145—150	...	...
90,000	10	June 8	†3½	‡4	South African...	4—5	...	...
1,152,635	1	Sept. 7	1/2⅞	1/2⅞	South East'n Gas. Cn.Ld. Ord.	27/—29/-	...	27/6—27/10
845,511	1	,,	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref.	21/—23/-	...	22/-
200,000	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	20/6—21/6	...	...
150,000	Stk.	Aug. 10	...	3½	Do. 3½ p.c. Red. Deb. ...	100—102	...	...
6,709,895	,,	Feb. 1	5	6	South Met. Ord.	115—118*	−2	114½—116½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	143—148*	−2	143—144
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	102—106*	−1½	103
1,895,445	,,	Dec. 14	3	3	Do. 3 p.c. Deb. ...	82—85	...	82—83
1,000,000	,,	Jan. 4	5	5	Do. 5 p.c. Red. Deb....	113—116	...	114½
1,543,795	,,	Feb. 1	6	6	South Suburban Ord. 5 p.c....	128—133*	−2	129—133
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	120—125*	−1	...
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	101—106*	−1	...
888,587	,,	Dec. 14	5	5	Do. 5 p.c. Deb....	122—127	...	125
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	103—108	...	104
427,859	1	Nov. 16	1/2⅞	9⅞	S. Western Gas & Water Ord.	21/—23/-	...	...
160,523	1	Oct. 19	-/10½	-/10½	Do. 4½% Red. Cum. Pref.	20/6—22/6	...	21/3—22/3
110,000	Stk.	Dec. 14	4	4	Do. 4% Red. Deb. ...	100—105	...	...
647,740	,,	Feb. 1	5	5½	Southampton Ord. 5 p.c. ...	111—116*	−2	...
121,275	,,	Jan. 4	4	4	Do. 4 p.c. Deb. ...	100—105	...	102½
350,000	,,	Aug. 10	5½	5½	Swansea 5½ p.c. Red. Pref. ...	112—117	...	114½
106,000	,,	Jan. 4	6½	6½	Do. 6½ p.c. Red. Deb. ...	98—101	...	100—100¼
94,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
1,076,490	,,	Aug. 10	6½	6½	Tottenham and District Ord.	152—157	...	154—155
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref....	130—135	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref....	120—125	...	...
371,850	,,	Nov. 30	4	4	Do. 4 p.c. Deb. ...	102—107	...	...
369,774	,,	Aug. 10	7	7	Uxbridge, &c., 5 p.c. ...	165—170	...	...
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	123
1,340,521	,,	Feb. 1	7	7	Wandsworth Consolidated ...	157—162*	−2	158½—159½
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref ...	120—125*	−2	123
500,000	,,	,,	33/4	4	Do. 4 p.c. Pref. ...	103—106*	−1½	...
1,317,964	,,	Dec. 14	5	5	Do. 5 p.c. Deb. ...	125—130	...	128
338,300	,,	,,	4	4	Do. 4 p.c. Deb. ...	102—107	...	...
499,735	,,	Feb. 1	7	7	Watford and St. Albans Ord.	155—160*	−2	...
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125*	...	...
200,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	129—134*	−2	...
200,000	,,	Dec 14	4	4	Do. 4 p.c. Red. Deb.	100—105	...	...
100,000	,,	,,	3½	3½	Do. 3½ p.c. Red.Deb.	99—102	...	...

a.—The quotaion is per £1 of Stock. * Ex div. † Paid free of income-tax. ‡ For year. § Actual.

Stock and Share List continued overleaf.

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AND
TOWER
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FREE FROM STAINS

Large Stocks carried in

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STOCK AND SHARE LIST—Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Feb. 5.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	Feb. 1	5	6	Bath Cons.	125—127*	...	...
1,667,250	,,	July 6	5	5	Bristol, 5 p.c. max.	119—121	...	...
120,420	,,	Dec. 14	4	4	Do. 1st 4 p.c. Deb. ...	102—104	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	101½—103½	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	122—125	...	...
274,000	,,	Aug. 10	5	5	Newport (Mon.) 5 p.c. max. ...	110—114	...	...
13,200	12	Sept. 7	8½	7	Pontyp'l Gas & W. 10 p.c. 'A'	13½—14½	...	...
13,600	10	,,	6	5	Do. 7 p.c. 'B'	12—12½	...	...
40,000	10	,,	6	5	Do. 7 p.c. 'C'	12—12½	...	...
140,778	Stk.	Feb. 1	5	5	Weston-super-Mare Cons. ...	110—112*	−2	...
64,338	,,	Dec. 14	4	4	Do. 4 p.c. Deb.	98—101	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	160—163	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Feb. 1	5	6½	Chester 5 p.c. Ord.	104½—109½*	−2¾	...
92,500	,,	Dec. 14	4½	4	Do. 4 p.c. Pref.	98—102	...	...
32,540	,,	,,	3	3½	Do. 3½ p.c. Deb.... ...	90—95	...	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	99—103	...	...
2,167,410	,,	Aug. 24	6	6	Liverpool 5 p.c. Ord. ...	136—138	+1	...
245,500	,,	Dec. 14	5	5	Do. 5 p.c. Red. Pref. ...	101—106	...	...
306,083	,,	Jan. 4	4	4	Do. 4 p.c. Deb. ...	103—105	...	...
106,280	,,	Feb. 1	10	10	Preston 'A' 10 p.c.	194—204*	−4	...
188,219	,,	,,	7	7	Do. 'B' 7 p.c.	134—144*	−3	...
NEWCASTLE EXCHANGE.								
122,577	Stk.	Feb. 1	8	8	Blyth 5 p.c. Ord.	166—168	...	...
732,000	,,	Aug. 10	5	5	Hartlepool G. & W. Cn. & New	125—127	...	...
2,061,315	,,	Feb. 1	5	5½	Newcastle & Gateshead Con.	25/—25/6*a*	—/6	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	102½—103½*	−1½	...
776,706	,,	Jan. 4	3½	3½	Do. 3½ p.c. Deb. ...	99—101	...	...
277,285	,,	Nov. 2	5	5	Do. 5 p.c. Deb. '43...	108—109	...	...
209,820	,,	Aug. 10	8½	8½	South Shields Con.	172—174	...	...
299,542	,,	Feb. 1	6	6	Sunderland 6 p.c. max. ...	138½—139¼*	−1¼	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Aug. 10	10	7	Derby Con.	185—195	...	...
55,000	,,	Dec. 14	4	4	Do. 4 p.c. Deb.	100—105	...	...
84,750	,,	Feb. 17	5	12	Long Eaton 'A' Ord. ...	...	...	...
50,000	,,	,,	4	10	Do. 'B' Ord. ...	...	...	...
20,000	10	Dec. 14	5	5	Do. 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Aug. 10	10	10	Great Grimsby 'A' Ord. ...	220—230	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	220—230	...	...
79,000	,,	,,	10	10	Do. 'C' Ord. ...	205—215	...	...
1,806,339	,,	Aug. 24	6	6	Sheffield Cons.	146—148	...	...
95,000	,,	Jan. 4	4	4	Do. 4 p.c. Deb.	101—104	...	...

a The quotation is per £1 of Stock.

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	Nov. 2	5	25/-*a*	Ascot Ord.	118—123	...	...
128,182	,,	Jan. 4	5	5	Do. 5 p.c. Pref.	115—120	...	120
312,083	1	Nov. 16	5	5	Assd. Gas and Water Ord. ...	21 6—23 6	...	22 3—22 9
326,071	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	21/—23/-	...	...
150,000	Stk.	Sept. 21	...	3½	Do. 3½ p.c. Red. Deb. ...	98—101	...	...
17,000	,,	Aug. 24	8	8	Bognor Orig. Ord. 'A' ...	175—185	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	175—185	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	145—150	...	...
37,440	,,	Feb. 1	10	10	Cam. Univ. & Town 10 p.c.max.	202—212*	−3	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	155—160*	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	107—112*	−1	...
65,000	,,	Aug. 10	8½	7½	Eastbourne 'A' 5 p.c. ...	175—180	...	175½
198,000	,,	,,	7	6	Do. 'B' 3½ p.c.	142—147	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	...
130,000	,,	Dec. 14	5	5	Do. 5 p.c. Deb.	122—127	...	...
24,000	30	Feb. 1	8½	8½	Great Yarmouth 8½ p.c. max.	50—55*	−1	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.	41—45*	−½	...
51,160	Stk.	Dec. 14	5½	5½	Do. 5½ p.c. Deb.	123—128	...	...
152,600	,,	Sept. 7	8	8	Guildford Cons.	200—210	...	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	114—119	...	...
68,250	,,	Dec. 14	5	5	Do. 5 p.c. Deb.	120—125	...	...
156,600	,,	Aug. 24	7½	7½	Hampton Court Cons. ...	173—178	...	...
107,960	10	Oct. 5	5½	4	Mid Kent Ord.	9½—10½	+1	...
230,940	Stk.	Aug. 10	10	10	Oxford & DistrictOrd. ...	215—225	...	...
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	113—118	...	...
126,193	,,	Nov. 16	7½	7½	Peterborough Ord.	162—172	...	...
64,990	,,	Sept. 7	6½	7½	Redditch Ord.	133—143	...	...
166,850	,,	Aug. 10	9	8	Romford Ord.	160—170	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Sept. 21	5	5	Do. 5 p.c. Deb.	120—125	...	...
10,950	,,	Aug. 24	8	8	Ryde Ord.	165—170	...	...
136,191	,,	Aug. 10	7	5	Scarborough Ord.	126—136	...	...
27,825	,,	Feb. 1	8	8	Shanklin & Ventnor Cons. ...	170—180*	...	...
40,643	,,	Sept. 21	7	7	Slough Ord.	156—161	...	...
221,000	,,	Dec. 14	5	5	Do. 5 p.c. Deb.... ...	116—121	...	...
28,872	1	Nov. 2	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	22/—24/-	...	...
28,866	1	Sept. 7	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	22/—24/-	...	...
137,730	Stk.	Aug. 10	7	7	Southgate & Dist. 7 p.c. max.	151—156	...	153
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	120—125	...	...
117,228	,,	Aug. 10	6	5	Swindon Cons.	110—115	...	...
60,425	,,	Dec. 14	5	5	Do. 5 p.c. Deb.	118—123	...	...
64,380	,,	Dec. 14	5	5	Torquay and Paignton 5 p.c. Pf.	115—120	...	...
750,000	1	Oct. 5	5·52d.*a*	4	Utd. Kingdom Gas Cpn. Ord.	21/6—22/6	...	21/9—22/3
606,270	1	,,	2½	2½	Do. 4½ p.c. Prefd. Ord. ...	20/—22/-	...	20/6—21/3
936,338	1	Nov. 16	4½	4½	Do. 4½ p.c. Cum. Pref. ...	21 6—23 6	...	21 9—22/1½
600,000	Stk.	Sept. 21	3½	3½	Do. 3½ p.c. Red. Deb. ...	99—102	...	101
130,000	,,	Aug. 10	8	5	Wakefield Ord.	140—145	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	105—110	...	...
82,000	,,	Feb. 1	6	6	Weymouth Ord.	105—110*	...	...
98,384	,,	Feb. 1	6	6	Wolverhampton 6 p.c. Pref....	125—130*	−2	...
160,000	,,	Dec. 14	5½	5½	Do. 5½ p.c. Rd. Db	110—115	...	...
370,000	,,	July 20	6	4	York Cons.	110—120	...	...
90,000	,,	Dec. 14	5	5	Do. 5 p.c. Red. Deb. ...	108—113	...	...
133,640	,,	July 20	6½	6½	Yorktown (Cam.) 5 p.c ons.	140—150	...	...
120,000	,,	,,	5	5	Do. 5 p.c. Pref.	123—128	...	...
35,000	,,	Dec. 14	5½	5½	Do. 5½ p.c. Deb.	128—133	...	...

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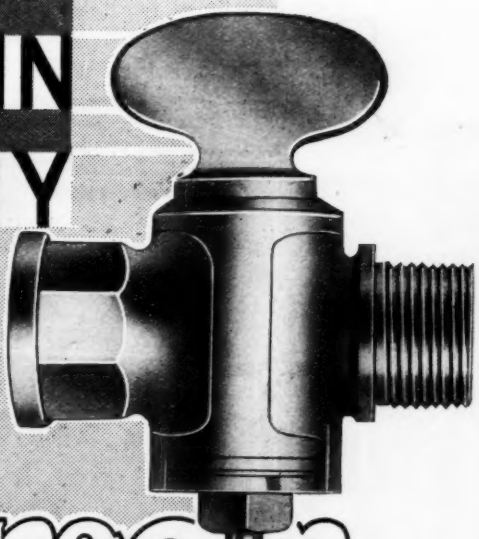

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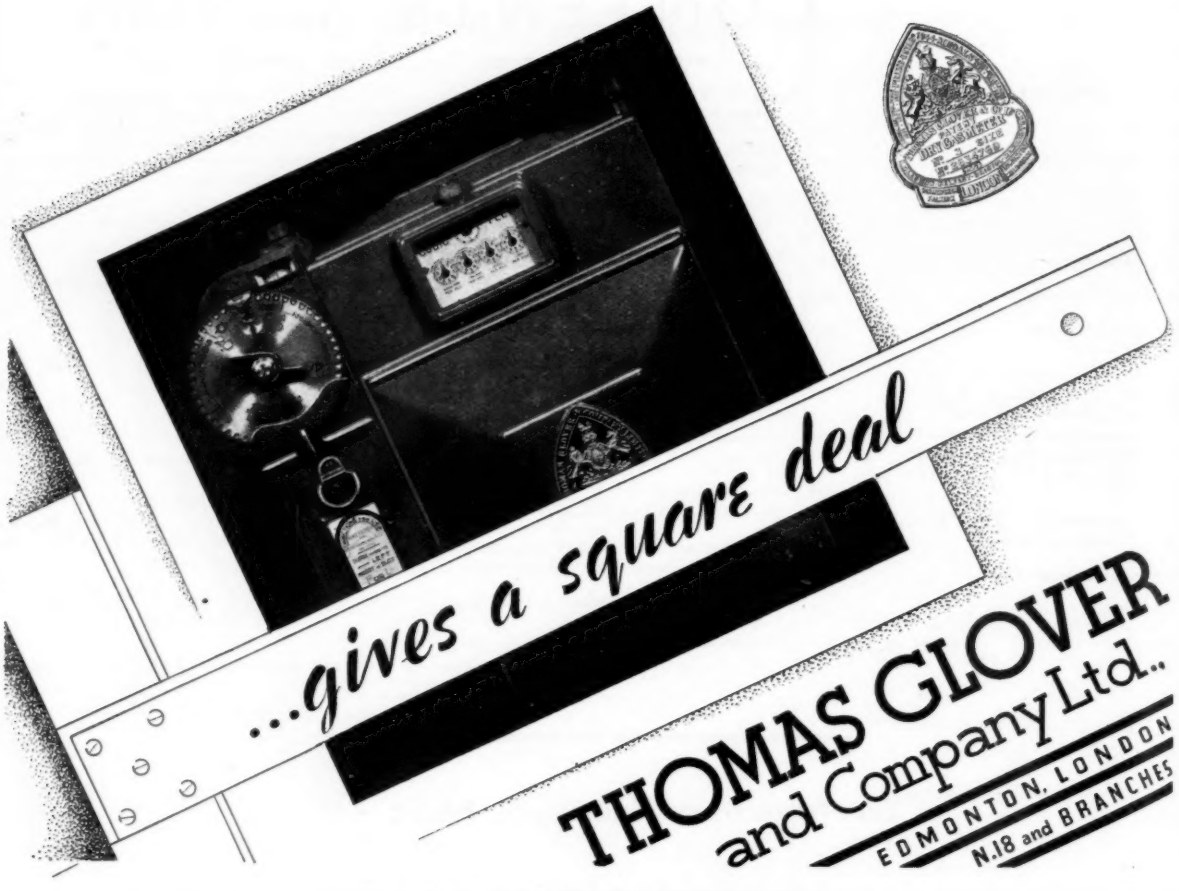

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